TIMELINE (619) 727 - 3300

TABLE OF CONTENTS

1.0 OVERVIEW

TimeLine's LYNX is a high performance modular time code product which is actually four independent functional units contained in a single enclosure. Each module features the following:

- SMPTE / EBU time code generator.
- SMPTE / EBU time code reader (wide band)
- Transport synchronizer / resolver.
- SMPTE / EBU RS-422 port for external control.

The system architecture assigns one LYNX module to each transport to be controlled. When multiple modules are interconnected with standard 9 pin RS-422 cables, they form a time code system that can synchronize an unlimited number of transports on-line simultaneously.

The Lynx module is characterized by a lack of internal adjustments necessary for configurations to different transport types. Changeover from one transport type to another is accomplished by menu selection from the front panel. This action automatically reconfigures:

- Logic input levels.
- Logic input polarities.
- Tach rates
- Analog outputs
- Frequency outputs
- Toggle rates
- Ballistics information

Because this information is contained within the system and is selected by menu, the Lynx module wakes up with much of the information necessary to operate immediately. Typically, the only "learned" information necessary for proper operation is the tape speed (i.e. 15/30 ips) which is determined by reading time code for 10 seconds before first use.

The independent generator allows convenient local time code striping for each controlled transport.

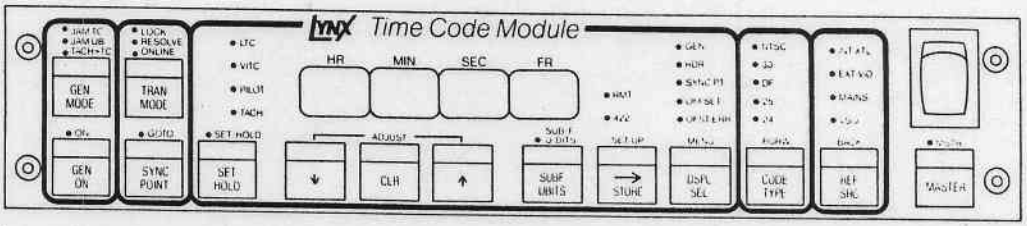
1.1 ABOUT THIS MANUAL

This manual is not intended as a tutorial on using timecode, but will act as a description of Lynx features and controls. In a future edition, these feature descriptions will be enhanced by pictorial representations in an easy to use format.

If you want to quickly do simple synchronization before using the more sophisticated features of the Lynx module, see section 3.0.

2.0 FEATURES AND CONTROLS

2.1 Front Panel Description



2.1.1 TRAN MODE

Selects whether or not the LYNX transport is ONLINE or OFFLINE. When OFFLINE the LYNX module will relinquish all control over the transport.

2.1.2 TRANSPORT MODE LIGHTS

ON LINE light

Indicates the LYNX module is either a master or slave. If it is not the master, the transport is automatically made a slave to any other module selected as master.

When not lit, the Lynx module relinquishes all control over the transport.

RESOLVE Light

Indicates that the transport is in 'play', and that its timecode is resolved to within 20 "subframes". (20/100 frame) of the master's reference source.

LOCK Light

Indicates that the transport is in 'play' and its timecode is resolved to within 2 subframes (2/100 frame) of the master's reference source.

NOTE:

In the special case when the LYNX is controlling a video or digital audio transport, the transport is brought into lock, and then completely released to its own servo reference. At this time the transport may cause itself to re-frame. The lock/resolve lamps will stay lit under these conditions as long as the machine does not lose lock and stays within one frame of the correct position.

See section 6.3 for a more complete description of

video or digital audio slave operation.

NOTE:

The master transport, as well as all the slave transports, is resolved to the master reference source. In this fashion, master wow, flutter, and bad frame codes will not be passed down to the slaves under normal conditions.

This is true unless the VSO mode is intentionally selected for the master, at which time the master capstan speed is released, and the slaves follow the speed of its timecode. This is normally used when using a source of time code ("CODE ONLY MASTER") as the master, or when it is desired to vari-speed the master machine for off-speed audio mixing.

(See section 6.1.2 for a description of VSO mode and the function of the master reference key.)

2.1.3 GEN MODE

Selects the GENERATOR MODE. This key can be used to PRESET the generator mode by touching it when the generator is stopped, or can be used to momentarily change mode "on the fly" if touched when the generator is already running.

WHILE STOPPED:

JAM TC or JAM UB may be 'preselected' as explained below.

WHILE RUNNING:

The GEN MODE key will cause the generator to immediately "jam sync" once to the reader input; that is to say, the generator will continue generating code but will instantaneously reproduce the timecode number present in the reader at the moment the GEN MODE key is touched, and will then continue running sequentially.

2.1.4 GENERATOR MODE LIGHTS

If no generator mode lights are on, the generator will generate continuous time code when running, and can be started and stopped with the GEN ON key. This is the "normal mode".

JAM TC Light

Indicates that generator will automatically jam sync to the reader input after three valid, consecutive reader frames are read. The transfer

from reader to generator will re-occur if reader timecode is discontinuous when three new valid, consecutive frames are received. Otherwise the generator will produce consecutive frames.
This mode is used to re-generate code when making tape copies, or for reconstructing code that is poorly recorded or has dropouts. See section 4.5.

JAM UB Light
Indicates that simultaneously while generating normal timecode, the "user bits" (spare) portion of the timecode is being filled with the present reader time. This is a special function primarily used by remote editing systems.

The user bits will faithfully follow the current reader time, whether the reader is stopped or moving.

Section 8.7 for a description of user bits.

NOTE:
The user-bits portion of the timecode is permanently set to 00:00:00:00 unless intentionally entered by means of the front panel or during the jam sync process.

TACH > TC LIGHT
Not used.

2.1.5 GEN ON

GEN ON LIGHT
This toggles the generator on/off. The light directly above the key indicates that the generator is running. When the light is not lit it indicates that generator is off, ready to resume at the last frame transmitted. There is no output from the generator when it is in the off/hold mode.

2.1.6 SYNC PT KEY
SYNC PT LIGHT

This is a dual function key.

GOTO A SYNC POINT
When touched and released, executes a GOTO to the current sync point, and the GOTO light flashes.

SETTING A SYNC POINT

When touched simultaneously with SET, will load the sync point from the current tape time, either while the tape is stationary or while it is moving.

When a sync point is set, the Lynx module automatically compares the timecode number just loaded to that of the module previously assigned as the "master", and computes and stores the result in the Lynx offset memory, which can be displayed in the display OFST position.

At the moment a sync point is set, the display will switch to the SYNC PT position for approximately 2 seconds to show the number just loaded.

WARNING:

Before setting a SYNC PT, it is essential that a 'master' be assigned, and for its sync point to be set prior to assigning slave sync points.

NOTE:

In software versions prior to release 4.04, your Lynx module has a GOTO key in this position. This has the same function as the goto function described above. To set a sync point, perform the following procedure:

- Place the display in RDR position.
- Capture the RDR timecode by touching the SET HOLD.
- Move the DSPL SEL down to SYNC PT position.
- Hold the STORE key until the display stops flashing.

The reader value has now been stored as a sync point.

2.1.7 SET/HOLD

SET/HOLD LIGHT

When first touched, holds (or "freezes") the display, and causes the set/hold light to flash.

At first, the hours column will flash. This will allow the hours value to be adjusted and set. When touched again, moves the flashing column to the right, allowing each succeeding column to be adjusted.

To release the display from hold mode, hold this key until the set/hold light goes out. This will allow the display to resume counting.

NOTE:
The set/hold mode does not affect the generator or reader input or outputs while the columns are being adjusted, unless the value is actually "stored" as described below.

2.1.8
2.1.9
2.1.10 ADJUST

These keys are used while in the SET HOLD mode.

v Subtracts one from the number in the flashing column.

^ Adds one to the number in the flashing column.

CLR When held, will clear the display to 00:00:00:00.

NOTE:
When the ^ or v keys are touched numbers will increase or decrease one integer at a time. HOLDING these keys will cause the numbers to scroll automatically.

The CLR key can also be used to clear a permanent error message from the display, such as the "NO VIDEO" message which appears if loss of video sync is encountered.

2.1.11 SUBF/UBITS

In the GEN and RDR modes, causes the display to show the user-bit of the time code. The UBITS light will flash when user bits are being displayed. To resume showing timecode, touch this key again.

In the OFFSET and OFST ERR modes, causes the display to show an offset of less than one frame, in units of 1/100 frame. The SUBF light will flash when sub-frames are being displayed. To resume showing frame offset, touch this key again.

NOTE:
The subframe display feature will be supported in software release 4.04.

2.1.12 STORE

Allows you to store a timecode number when SET HOLD is flashing. The displayed value is stored into the location shown by the DSPL SEL leds, and the SET HOLD mode is released.

2.1.13 DISPLAY

Toggles through display to the various LYNX registers.

2.1.14 DISPLAY LIGHTS

Shows the current selection being displayed in the main display.

NOTE:
The DSPL SEL also affects the CODE TYPE and REF SRC displays, as described elsewhere.

GEN
Indicates that the generator time is being displayed. The CODE TYPE and REF SRC lights show the current generator status.

RDR
Indicates that reader time is being displayed. If actual time code is being read, the LTC light is on and the actual incoming timecode value appears in the display. If timecode is not present, the display is then continually updated by tach time or pilotone, if present.

SYNC PT
AS A SLAVE: Shows the point which is to be synchronized with a likewise selected point on the master transport.

AS A MASTER: Shows the position that all slave sync points are to be synchronized with.

NOTE:
See SYNC PT key description for a full description of the sync point register.

OFFSET
Displays the intended number of frames difference between the slave transport relative to the master transport.

OFST ERR

Indicates the actual number of frames difference between the intended offset and the current position. When two transports are in 'lock' this value goes to zero.

2.1.15 CODE TYPE KEY

Selects the speed and code type of the generator code. The generator must be off to access this function, and the display must be in the GEN position. The lights immediately above this key are explained below.

2.1.16 CODE TYPE LIGHTS

Shows the code type of reader and / or generator, as well as the generator code speed.

WHEN DSPL SEL IS GEN:

The display shows the the speed, and type of time code being generated.

NTSC LIGHT

This is a generator speed indicator, and can be on when generating 30 or 30DF timecode.

When ON:

Indicates that the code being generated is running at a speed of 29.97 frames per second. This is normally referred to as NTSC color speed since this is the speed at which color video frames run, and is the speed at which most video timecode is generated.

When OFF:

Indicates that the code being generated is running at a speed of 30 frames per second. This is the reference many times used when timecode is to be used for purposes of syncing up with 35mm film.

NOTE:

The rest of the indicators in this row show the type of time code being generated.

30 LIGHT

Indicates that time code being generated is "non-drop frame" SMPTE time code. There are 30 frames for every second displayed.

When used with the NTSC light out (non color speed) this will produce 24 hours of time code for every 24 hours of elapsed time.

DF LIGHT

Indicates that time code being generated is "drop-frame" SMPTE time code. There are 30 frames for every displayed second, except for certain numbers which are skipped, or 'dropped'. The total number of frames dropped is 108 per hour.

When used with the NTSC light on (color speed), this will produce 24 hours of time code for 24 hours of elapsed time.

(See appendix 8.7 for an explanation of drop-frame time code.)

25 LIGHT

Indicates that time code being generated is 25 frames/second EBU (European Broadcast Union) time code. There are 25 frames for every displayed second.

24 LIGHT

Indicates that time code being generated is 24 frames/second film style time code. This is a non-standard timecode used for special usage with film systems.

WHEN DSPL SEL IS NOT GEN:

The display is showing the type of time code being fed into to the time code reader.

NTSC LIGHT

Extinguished (used only in the GEN display)

30 LIGHT

Indicates that time code being read is 30 fps "non-drop frame" SMPTE time code.

DF LIGHT

Indicates that time code being read is 30 drop-frame SMPTE time code.

25 LIGHT

Indicates that time code being read is 25 frames/second EBU (European Broadcast Union) time code.

24 LIGHT

Indicates that time code being read is 24 frames/second film style time code.

2.1.17 REF SRC

Selects the reference speed of the generator, as well as the reference play speed of the transports.

The particular function in use is determined by the DSPL SEL position. See below.

2.1.18 REF SRC LIGHTS

Shows the currently selected reference source of the generator and / or master machine, as follows.

WHEN DSPL SEL IS GEN:

The lit indicator shows the source of the generator speed.

INT XTL

Indicates that the generator is locked to the internal crystal of the LYNX.

EXT VID

Indicates that the generator is locked to the external video reference plugged into the EXT VID jack. If no signal is present this position is disallowed, and the message "no video" appears in the timecode display.

WHEN DSPL SEL is not GEN:

The lit indicator shows the selected play speed reference which all machines use when being synchronized. It will only be lit when the LYNX module is selected as the current MASTER.

NOTE:
At any time, only THREE positions are available as the master system reference. The first position is the current selection of the generator reference, and the remaining two positions are MAINS and VSO.

INT XTL

Indicates the synchronizer is using the generator internal crystal as the system reference.

EXT VID

Indicates that the synchronizer is using the generator external video reference as the system reference.

MAINS

Indicates that the synchronizer is using the incoming power line frequency as the system reference.

VSO (variable speed override)

Indicates that the master is allowed to run at its own play speed (commonly called "wild speed") and the speed of its timecode will be passed down to the slaves as the play speed reference for synchronization.

This can allow the master transport's VSO control to be used to alter the play speed of the entire system for off-speed mixing, or can allow the use of "code only" as a master, without transport cables hooked up to the master machine.

The disadvantage of using this mode is that wow and flutter may be passed down from master to slaves, although this effect is minimized by digital filtering in the Lynx module.

2.1.19 MASTER

Selects the LYNX module as the system master. The unit must be previously have been put ON LINE for this function to operate. Once a master is selected, the MASTER keys on all other system LYNX modules are deactivated.

A new master can be chosen at any time by deselecting the current master first.

2.1.20 MSTR LIGHT

Indicates that LYNX has been designated as the system master.

2.1.21 POWER SWITCH

Controls AC power to the LYNX module. It is highly recommended that power not be turned on or off while tape is threaded and the attached transport is in 'ready' mode.

2.1.22 RMT LIGHT

Indicates that front panel is being remote controlled by an external controller or editing computer. Front panel keys are disabled in this position.

2.1.23 422 LIGHT

Indicates that the LYNX is either transmitting or receiving RS 422 information on its 422 port.

2.1.24 NUMERIC DISPLAY

Time Code/Message Display. Displays time code and user bits in hours, minutes, seconds and frames. Displays offset and offset error in sub-frames. Displays all menus and error messages.

2.1.25 READER SOURCE INDICATOR LIGHTS

These indicators are active regardless of other information being displayed on the panel.

When all lights are out, it indicates that the source of the timecode showing in the RDR display was last received from incoming time code, not tach or pilot.

LTC

Indicates that valid time code is present at the reader input.

VITC Light

Indicates that valid VITC (Vertical Interval Time Code) is present at the optional VITC Reader input. (option)

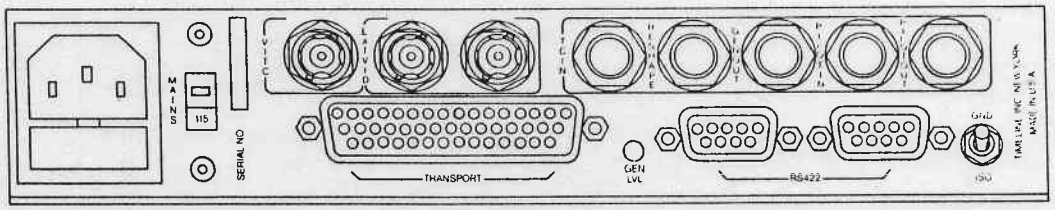
PILOT Light

Indicates that pilotone is being read in lieu of time code at the reader input.

TACH Light

Indicates that transport tach pulses are being used to drive the reader display.

2.2 REAR PANEL DESCRIPTION



2.2.1 POWER AND FUSE INFORMATION

Accepts factory supplied power cord. Switch to the right of male power socket selects voltage on which the LYNX will safely operate. This switch has two positions, 115 and 230.

Contains fuse drawer which holds the AC power fuse. The drawer is accessed by inserting the blade of a small screwdriver into the slot at the lower front of the power cord receptacle opening and twisting the blade. The fuse drawer will slide out. There are two positions in the drawer. The one furthest in is the active position the one nearest to the back panel is for a spare.

WARNING:

The LYNX is supplied with the proper fuse for operation on the voltage for which it is set at the factory. If you wish to change the voltage setting you MUST also change the fuse.

VOLTAGE SETTING	FUSETYPE
115	1/4 Amp GMA
230	1/8 Amp GMA

WARNING:

Operation of LYNX with mains switch in the wrong position can cause irreparable damage to the unit. This damage is not covered by the factory warranty. Be very sure this switch is in the correct position and the proper fuse is installed before applying power to the unit.

2.2.2 SERIAL NO.

Individual LYNX serial number. Always refer to this number when consulting your dealer about your LYNX. These numbers are recorded at the factory to identify the software, hardware, and other engineering changes.

2.2.3 VITC Connector (OPTION)

Female BNC type connector which receives VITC (vertical interval time code) to the LYNX reader. The VITC reader is a non-standard option. Before attempting to use this input check to see that your LYNX is equipped with the VITC reader card.

2.2.4 External video reference input

Either one of the two identical female BNC type connectors can be used to receive a reference signal for the EXTVID reference source selection. They are hardwired together so that the unused plug becomes an extension, used either to loop the video through the LYNX or terminate the video by attaching a 75 ohm terminating plug.

2.2.5 Reader timecode input connector

Electrically balanced, standard female 1/4" phone jack, tip-ring-sleeve type, used as the input for the reader time code. Time code output of transport is connected to this input.

2.2.6 Reader RESHAPE output (code or pilot)

Electrically unbalanced, standard female 1/4" phone jack, tip-sleeve type, provides reshaped reader time code for dubbing. This can alternately supply a reshaped pilot signal derived from the incoming timecode. See section 3.3.

2.2.7 Generator timecode output Connector

Electrically balanced, standard female 1/4" phone jack, tip-ring-sleeve type. Provides output of generator time code when the generator is on.

2.2.8 Reader Pilot input connector

Electrically balanced, standard female 1/4" phone jack, tip-ring-sleeve type. Accepts pilotone input used by the synchronizer to resolve transport speed to a prerecorded tone which is 2x the system frame rate. (This feature will be supported in software release 4.10).

2.2.9 Generator Pilot out Connector

Electrically balanced, standard female 1/4" phone jack, tip-ring-sleeve type. Provides a 48/50/60 shaped square wave locked to the generator clock. The frequency of this signal is always 2X the frame rate of the time code being generated. It is always present, whether or not the generator is on or off.

2.2.10 TRANSPORT Connector

50 pin D style connector which accepts factory supplied transport interface cables.

2.2.11 GEN LVL. Adjustment

Adjusts the output level of the generator from -10 to +6 dbm.

2.2.12 RS 422 Connectors

Standard 9pin female RS 422 connectors used to connect the LYNX module to other LYNX modules or to an external controller or editor. All LYNX modules in a system must be joined together using a standard RS 422 cable. Both connectors labelled RS 422 are parallel wired.

2.2.13 GND/ISO Switch

This toggle switch determines whether the chassis is grounded to the transport.

In the GND position, the transport is grounded to the chassis.

In the ISO position, the chassis is electrically isolated from the transport. This position may be used where multiple LYNX modules are mounted in a single rack, yet it is desired to keep the individual grounded separately so as not to disrupt an existing grounding scheme.

WARNING:

The EXT VID and RS422 connectors share the same ground, and are always ground isolated from both transport AND chassis ground. This means there may be a ground potential between the video BNC and the transport cables.

3.0 INSTALLATION and SIMPLIFIED OPERATION

NOTE:
It is strongly suggested that you save the factory supplied shipping carton as it is specially designed to protect your LYNX module if it ever requires re-shipment.

3.1 RACK MOUNTING INSTRUCTIONS

LYNX modules are designed to rack mounted side by side, if desired. Each module comes with a single rack "ear". To assemble two units for rack mounting:

- Remove the top covers of the two units. Install the rack "ear" on right hand side of one LYNX and the left hand side of its associated pair. Use the 8-32 flat head hex screws provided, and the #8 self locking nuts, required only on the left unit.

- To join two LYNX modules together at the center, temporarily lift up the small circuit card on the right unit by removing its four mounting screws.

- Using the the front and back mounting holes in the lift side of the Lynx chassis, screw the right unit to the left unit using the two 8-32 pan head phillips screws, and two split ring lock washers provided.

- Replace the reader card on the right unit.

- Replace the top covers on both units. The pair is now ready for mounting in a standard 19" rack.

3.2 POWER ON INITIALIZATION

3.2.2 TRANSPORT SELECTION
(using blue-labeled keys on front panel)

The blue labels on the front panel refer to the setup functions of the controls. They are referred to here in (parentheses).

When the LYNX is powered on, a transport name will be flashing in the display.

- Use the (FORW) and (BACK) keys to step through the transport menu to find the transport name that corresponds to the transport which the LYNX will control. The transport menu is explained in APPENDIX Section 8.1.

- When the desired transport name appears in the display touch STORE (SETUP). The display will stop

flashing.

- Verify that the correct transport name appears in the display. Touch the (MENU) key. The display will now read "done".

- Hold STORE (SETUP). The transport parameters are now automatically stored in the LYNX memory. The display will now read 00:00:00:00, initialize to the RDR display, and the unit is now ready for operation.

- After the above initialization procedure, be sure to read 5 seconds of actual timecode on the newly initialized transport so the Lynx module can determine the current transport speed.

3.2.3 INITIALIZATION AS A GENERATOR OR READER ONLY

When the Lynx is to be used as a generator or reader only, where no transport cable is connected, select any transport from the transport menu.

3.2.4 INITIALIZATION FOR CODE-ONLY MASTER USE

When the Lynx is to be used as a code-only master, select any AUDIO transport from the transport menu.

As a code only master, the REF SRC must be in VSO mode. See section 6.2.

3.3 ADJUSTMENTS AND JUMPERS

3.3.1 Output level adjustments

There are three output level adjustments:

- Generator code output level (on rear panel).
- Reader reshaped code output level (under top cover).
- Reader reshaped pilot output level (under top cover).

A normal setting for any of these output levels would be approximately -5 Vu. The range of the outputs is -10 to +6 Dbm.

3.3.2 Reshape / reshaped pilot option

There is an internal option to select either reshaped timecode or reshaped pilot output from the rear panel RESHAPE jack. This selection is a small jumper plug, marked on the reader circuit card, labelled P5.

The two positions of this jumper are marked as follows:

RESHAP = Reshaped code output
PILOT = Reshaped pilot output

This jumper is factory installed in the "reshaped code" position.

The reshaped timecode is a squared-up version of the reader input signal. No reclocking, or other changes to the incoming code are made, and this signal can be used for direct timecode dubbing when desired.

The reshaped pilot output is extracted from the time code coming into the reader input, and is equal to 2x the incoming frame rate. The following nominal frequencies result:

INCOMING CODE	RESHAPED PILOT OUT
SMPTE non-color speed	60 Hz
SMPTE color speed	59.94 Hz
EBU	50 Hz

3.3.3 Reshape output level pots

The individual level pots for reshaped timecode and reshaped pilot outputs are located on the reader card, and are designated R22 and R23.

3.4 SIMPLIFIED OPERATING PROCEDURE

To verify that the LYNX synchronizing system is operating, the following simplified operating procedure will get you going without having to read the rest of the manual.

Once the system is operating, you can become more familiar with the advanced functions of the system by reading the complete operating instructions. The following instructions assume that two transports are to be synchronized with no timecode offset.

3.4.1 INTERCONNECTIONS

. Connect all LYNX units together using a standard 9pin RS 422 cable.
. Connect appropriate transport control cables from each LYNX to its associated transport.

3.4.2 TACH AND CABLE CHECKOUT

. Load time coded tapes on the transports. If no time coded tapes are available see Section 4 for instructions on how to generate and record time code.

. Make sure that the TCIN (reader input) is DISCONNECTED at this time.

. Make sure the RDR display is active. If it is not, touch the DISPLAY key until the RDR light is lit.

. Operate each machine manually to verify that when the transport is moving that the TACH light is on and the display is counting. The the display must count correctly in both forward and reverse.

. If the transport is running at 30ips, the display will count in 'clock time'. At 15ips, it will count 1/2 'clock time'.

3.4.3 READING TIME CODE

. Connect an audio line from the code output channel of each transport to the TCIN of each associated LYNX.

. Play each transport for 10 seconds and verify that time code is counting on the display and that the green LTC light is lit.

3.4. CHASE OPERATION

. Touch the TRAN MODE key on both LYNX modules. The ON LINE light will now go on.

. Select one LYNX as master by touching MASTER. Its MSTR light will now go on. The 422 light on BOTH panels will now be on.

. Put the master transport in the play mode. The slave transport will now search, play, and lock to the master.

. Verify all transports are "locked" by checking the LOCK light on all LYNX modules.

. The slave transport should now 'chase' and lock to the master transport no matter how the master transport is moved. You can now exchange which transport is the master by touching the illuminated master key, causing it to go out, and touching the other master key, causing it to light.

NOTE:

The very first attempt at lock may take up to 10 seconds.

3.5 KEY SENSITIVITY: TOUCH/HOLD EXPLAINED

Because certain keys, namely, SET/HOLD, CLR, and STORE, may cause an unwanted effect if bumped accidentally, they are programmed with a slight delay. When referring to these keys, the following terms will be used:

TOUCH = Depress for less than 1/4 second.
HOLD = Depress for at least one second.

3.6 ENTERING NUMBERS INTO THE DISPLAY

The ability to enter time code numbers into the eight digit display is a necessary part of many LYNX operations. This will normally be used to enter generator starting times, tach times, and offset and sync point values.

3.6.1 SET HOLD MODE

. Touching the SET/HOLD button will freeze the display. A flashing digit (cursor) will appear in the HR column, and the set/hold light will also flash.

3.6.2 CLEARING AND MODIFYING THE DISPLAY

. The display can be cleared to 00:00:00:00, if desired, by holding CLR.

. Touch v to subtract one from the cursor column, or touch ^ to add one.

. Touching SET/HOLD again will move the flashing cursor to the next column to the right.

. Repeating the above procedure will allow you to enter numbers into all the columns.

3.6.3 STORING A NUMBER

. When the desired time code number appears in the display it can be stored by holding the STORE key. The register to which the number will be stored is indicated by current position of DSPL SEL.

. The set/hold light will go out, and the display will now resume normal counting.

3.6.4 NEGATIVE NUMBERS

In the OFST and OFST ERR positions, values can be either positive or negative since these positions indicate a relationship between the master and slave transport positions, not an actual timecode value.

A positive number in the slave's offset register indicates the slave is ahead of the master the indicated amount, and a negative number indicates it is behind the master. Negative numbers appear with a flashing - (minus) sign in the tens of hours column.

To enter a negative number clear the display and use the v key to subtract from 00:00:00:00.

NOTE:

This feature will be supplied with software release 4.10. In releases prior to 4.10, subtracting one from 00:00:00:00 gives a high positive number of 23:59:59:29. This is equivalent in function to -00:00:00:01.

4.0 GENERATOR

Each LYNX module contains an independent Jam Sync time code generator. SMPTE drop and non-drop code, EBU 25 frame code and 24 frame film style codes are available from the LYNX.

In addition to the time code output signal, the LYNX provides a generator pilotone output signal.

4.1 GENERATOR REFERENCE

Before generating time code, it is important to know how the speed of the generator is derived, since speed control is an inherent part of using timecode.

In the Lynx module the REF SRC key selects either the internal crystal or external video sync as the reference for the generator. These are the two reference sources for the LYNX generator.

The generator must be stopped to change the generator reference. This helps to prevent the generator reference from being changed inadvertently.

4.1.1 SETTING THE GENERATOR REFERENCE

To set or change the generator reference:

. If generator is running, touch GEN ON to stop the generator.

. Touch REF SRC until light next to desired setting is lit.

. Press GEN ON. The generator will begin to run locked to the appropriate reference.

NOTE:

Since it is impossible to lock to external video unless that video signal is supplied, the "no video" error message will appear on the display if that is attempted. The LYNX will then automatically revert to its internal crystal reference. To clear the error message, touch CLR.

4.2 GENERATOR CODE TYPE

The time code frame rate is selected using the CODE TYPE key. The generator must be stopped to change this setting. This prevents accidental change of the frame rate by a single inadvertent key stroke.

Under normal conditions, it is suggested that 30 be selected as the standard frame rate, since this type of code can normally be read by almost all other timecode readers. In

Europe, 25 (EBU) is the code standard.

. If generator is running, touch GEN ON to stop the generator.

. Touch CODE TYPE until the light adjacent the desired position is lit.

4.3 GENERATOR ON/OFF (HOLD)

Once the generator reference and frame rate have been set:

. Touch the GEN ON key. The generator will begin generating time code from 00:00:00:00 or will continue generating from the last number displayed prior to stopping the generator. The ON Light above the GEN ON key will light.

4.4 SETTING THE GENERATOR

. Press DISPLAY key until light adjacent GEN is lit.

. Touch the SET/HOLD key. This will freeze the display and the cursor will flash.

. Enter the TIME CODE Point at which you want the generator to begin counting. See section 3.6 for an explanation of accessing the display if you are unfamiliar with the numeric entry procedure.

. Press STORE. The generator will now begin generating from that point. The display automatically leaves the SET/HOLD mode.

4.5 GENERATOR MODE

The GEN MODE key selects the four generator modes in which the generator locks to an external code or tachometer pulse source.

4.5.1 NORMAL GENERATOR MODE

When the LYNX is powered on, it automatically selects the normal generate mode. In this mode, when the generator is started, it runs sequentially from the starting number visible in the GEN display.

4.5.2 JAM SYNC MODE (MANUAL)

The generator can be loaded momentarily from the reader timecode input by touching the GEN MODE key while the generator is running.

This mode can be used to generate brand new timecode to replace already existing, poorly recorded code. This is done by causing the incoming timecode number to be transferred to the generator, at which time the generator will revert back to "normal mode" and generate sequential numbers.

The light adjacent JAM TC will momentarily light. At this point, the generator "looks" at the reader input and loads that time code value. It then continues to generate code counting from that reset value. It does not reload the reader code again unless the GEN MODE key is touched again.

The generator runs in normal generator mode after it has loaded the reader value, so it is necessary to make the new code and the old code are run at the same speed from that point on. This is done by making sure that source machine is resolved to the generator speed reference. See section 7.1.

4.5.3 JAM SYNC MODE (AUTOMATIC)

The automatic jam sync mode can be selected by depressing the GEN MODE key when the generator is stopped.

This is identical to the manual jam sync mode, except that the reader value is made to load automatically if the timcode goes out of sequence for more than three frames.

This mode can be used to create new code from a reel which has varying ("discontinuous") timecodes because the reel was spliced, or is composed of various material recorded at different times.

If the timecode input stops, the generator will continue to free run as described above. It only does an "autmoatic" jam when continuous new code is present, for more than three frames.

Again, the code speed must be resolved to the generator speed in order to operate correctly.

4.5.4 JAM SYNC TO GENERATOR USER BITS

This mode is normally only used by remote editing systems.

In this mode, the reader number is recorded into the spare "user bits" portion of the timecode waveform. Normal generator operation is not affected while in this mode.

If reader code stops, the last time code value will be repeated in the generator user bits.

The Jam > UB mode can be selected by touching the GEN ON key when the generator is stopped.

4.5.5 JAM SYNC PRINCIPLES

The LYNX generator always emits timecode at normal play speed. In order for the reader and generator frames to be counting at the same rate during jam-sync operation, it is necessary for the incoming timecode coming into the reader be resolved to the generator reference. This is accomplished by making the transport a MASTER during the jam sync operation.

See section 7.0 on using the LYNX module as a resolver.

WARNING:

We do not recommend using the automatic jam mode with video machines as a source, because if the incoming timecode was not correctly recorded, or if it is not framed correctly it is possible to generate faulty code. In software release 4.10, a warning message will be present to avoid this condition.

4.6. RECORDING TIME CODE

The output signal from the generator appears at the GEN OUT connector on the rear panel. To record time code, connect an audio cable from the GEN OUT connector to the appropriate audio input of the recorder.

4.6.1 GENERATOR OUTPUT LEVEL

The generator output level is adjustable with a rear panel trimpot. A typical code level would be -5 Vu.

4.6.2 PILOT OUTPUT

The pilot output is a shaped square wave output which is always 2 times the frame rate of the code being generated. This signal appears at the PILOT OUT connector on the rear panel, and can be recorded on a separate track along with the generator time code.

This signal can then later be used to allow the Lynx module to maintain synchronization, if for some reason the time code track becomes damaged or unusable. Under these conditions the Lynx module will use the pilot signal as a synchronizing reference during timecode dropouts.

Code type	Pilot frequency	
30	60Hz	
30-DF	60Hz	
30 NTSC	59.94Hz	
30-DF NTSC	59.94Hz	
25	50Hz	
24	48Hz	* non-standard

NOTE:

The PILOT OUT signal is continuously present at its output jack, even when the generator is off.