Lynx

Console Control Unit

Assistance and Information

TimeLine

1755 La Costa Meadows Drive
Suite B
San Marcos, CA 92069

Technical Support

Phone: (760) 761-4440
Fax: (760) 761-4449
SUPPORT@TIMELINEVISTA.COM

Software Version

Serial Number

Remember, when calling for technical support, you must provide the software version and CCU serial number so that we can give you accurate and prompt assistance.

Printing History

Each revision will cause the letter to the right of the manual part number to change. The purpose for each revision will be listed below. Events such as the addition of a feature or functional test will cause the revision number to change.

Internal Document Number: 73K010 Revision E

Revision Number	Approval Date	Serial No. Affected	Changes Made
C	2/18/93	N/A	Revised Figure 3-8 in Installation Section.
D	3/29/93	N/A	Remove "Required Cables" table in Installation Section.
E	9/12/94	N/A	Revised Neve Installation (page 3-18 and 3-24)

Limited Warranty

TimeLine Vista, Inc. (TimeLine) warrants this product against defects in material or workmanship as follows:

1.   For a period of ninety (90) days from the date of purchase TimeLine will at it's option, either perform necessary repairs at it's expense or pay the labor charges of others it authorizes to repair the defective product. After the initial 90 day period labor charges are the responsibility of the purchaser.

2.   In addition TimeLine will supply at no charge, new or rebuilt replacements for defective parts for a period of one (1) year from the date of purchase.

Labor and Parts

To obtain warranty service, the purchaser must notify TimeLine in writing during the initial ninety (90) day period. TimeLine will then authorize the purchaser to take or deliver, prepaid, the product to TimeLine or it's authorized Service Center.

Parts Only

During the remainder of the warranty period, any defective part will be replaced if the purchaser will take or deliver the product, prepaid to TimeLine. Labor incurred in the repair is at the purchaser's expense.

This Warranty does not cover any damage due to accident, misuse, abuse, or negligence.

We suggest that the purchaser retain the dated sales receipt as evidence of the original date of purchase.

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Safety

To assist identification of potentially hazardous circumstances or procedures, warnings and cautions will be displayed with the appropriate text. Occasionally, information that provides an enhanced understanding of the text will be provided with a Note.

Note

A Note provides information about
or an explanation of a topic related
to the subject being discussed.

Caution

Cautions describe procedures or equipment where personal injury may occur if the procedures are not performed precisely as specified.

Warning

Warnings describe a procedure that if not followed as specified could potentially cause damage to the equipment, a loss of data, or create an error condition.

Manual Contents and Use

To use this manual effectively, first review the applications and system configurations presented in the Applications chapter to determine your requirements and preferences.

Then use the Installation chapter to install the Lynx Console Control Unit (CCU) and make the correct equipment connections. Follow the initialization and start up tutorial described in the Getting Started chapter to get a "hands-on" demonstration of the CCU's capabilities.

If you experience any difficulties, refer to the System Verification and Troubleshooting chapter to analyze the problem. Refer to the subsequent chapters for detailed information about each of the CCU functions and general concerns.

The chapter contents are as follows:

Introduction
Provides a high level overview of the Console Control Unit, and feature list.

Applications
Presents common applications and configurations for Console Control Unit, audio, and video equipment.

Installation
Describes how to install and configure the CCU for your system.

Getting Started
Presents initialization, start up procedures, and basic operating instructions.

System Verification & Troubleshooting
Describes methods to verify that your system is correctly installed and troubleshooting procedures to isolate parts of the system which may be incorrectly configured or installed.

Features and Controls
Contains a description of the front panel LEDs and keys on the Console Control Unit (CCU). The descriptions are grouped byfunction.

Appendix
Appendix A
Provides miscellaneous information to help you setup or use your CCU.

Typography Conventions Used

This manual uses the following Typographical conventions.

Press   Press a key, generally a movement key or function keys such as CLR.

Select   Press or adjust the indicated key or knob to obtain the desired result or display.

You see   A key word, number, or indicator that is visible on the front panel or display.

CLR   This bold font indicates a particular key on the Console Control Unit, such as the clear key in this example.

LED   This is one of the lights on the front panel. LED means Light Emitting Diode.

Key   Each of the buttons, switches, or keys on the panel that you press to cause something to happen.

Display   The 16-character alphanumeric, dot matrix, LED display.

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Introduction

Figure 1-1. CCU Front Panel

What is the Console Control Unit (CCU)?

The Console Control Unit is a compact, panel mounted controller that provides centralized control for multiple tape transports, film transports, and other devices used in the post production environment. A Lynx Time Code Module provides synchronization and control for each transport. The Time Code Modules are then connected through a Lynx System Supervisor (SSU), which is controlled and operated by the CCU.

The Console Control Unit connects to the System Supervisor through a single RS-422 serial communications cable, which uses a serial protocol based on the ES Bus protocol standard. The Console Control Unit sends generalized commands to the System Supervisor, where they are translated into real-time machine control commands and transmitted serially to Lynx Modules that control the machines.

A number of CCUs may be daisy-chained together for simultaneous control from multiple operator positions. Alternatively, the system may be controlled by an external control computer such as an editing system, a computerized audio mixing console, a digital audio workstation, or a personal computer with the appropriate software.

The CCU is designed to be used as a synchronizer control interface in a Post Production System, which includes a Console Control Unit, a Lynx System Supervisor and up to six Lynx Time Code or Film Modules.
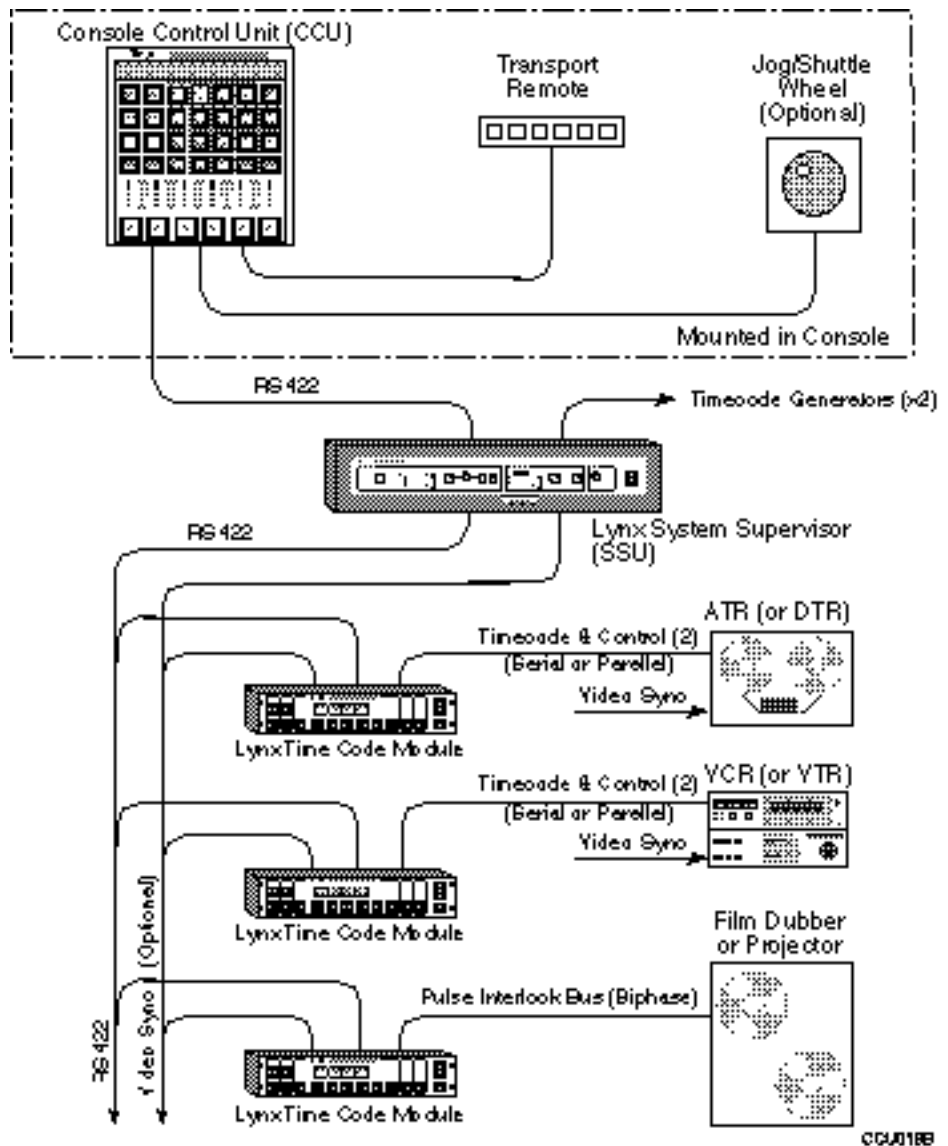

Figure 1-2. General CCU System Block Diagram

System Overview

Lynx Modules

Each transport in the system is connected to a Lynx module. The Console Control Unit requires Lynx Module firmware version V500-20 or later. Each time the module is powered up, the firmware version number is the first item shown in the module's sign-on display.

System Supervisor

The System Supervisor is a stand-alone system integration component that handles all high-speed data communications. It connects and controls the CCU, Lynx Modules and transports. Although some instructions for the System Supervisor are included in this manual, you should refer to the System Supervisor manual for detailed information.

The communications to and from the CCU and Lynx Modules are routed through the Lynx System Supervisor, or by a single serial cable.

Console Control Unit

The Console Control Unit provides functional control for each Lynx Time Code Module connected to the system. In the System Supervisor unit, the CCU also controls the dialog beep function, events GPI relays, and independent time code generators.

The control panel is designed for; ease of operation, with separate banks of keys for Device Selection, Group Select and Special Functions operations. A numeric keypad area is used to address specific devices and their associated memory registers, to perform time calculations, and to allow direct input of time and other numerical data. An alphanumeric display panel is mounted above the keyboard. This 16-character LED display is intuitively programmed to show context sensitive information, always.

Motion Control Keybank

A Motion Control Keybank may optionally be connected to the CCU. They support control of the edit and loop functions. Soloed or grouped transports can be easily controlled from the keybank.

Jog Shuttle Wheel

The Console Control Unit has an optional shuttle wheel that allows convenient trimming of numerical data as well as providing Shuttle and Jog modes for transports connected to the system.

Features

- Full edit functions
- Display select options
- Solo and group mode selection
- User selectable indicator function
- User setup/option entry
- Supports Jog/Shuttle interface
- Supports Motion control interface
- Supports track enable
- 100 memories

Specifications

Electrical	Mains Input	100-120 VAC at 60 Hz 200-240 VAC at 50 Hz
	Power Requirement	Approximately 30 W
	Power Supply	+5 VDC at 1.5A, external regulated +12 VDC at .2A, external regulated
Communications	RS422 SMPTE ports 38.4 K baud	RS207M standard
Mechanical	Dimensions	5.625"H x 5.4"W x 3"D 14.29 cm H x 13.72 cm W x 7.62 cm D
	Weight	.75 lbs (335 grams)
	Console cutout	4.2"H x 4.0"W 10.67 cm H x 10.16 cm W
	Mounting depth	.375" (.75 cm) below top of console panel (mounts on 4 standoffs)

Related Products

Lynx System

71A002	Lynx V500 Time Code Module (TCM)
71A004	Lynx FV500 Film Module
71A005	Lynx Keyboard Control Unit (KCU)
71A013	Lynx System Supervisor (SSU) ES Bus
71A014	System Supervisor with SSL interface card
71B002	SSU Option, SSL Console Computer Interface card

Micro Lynx System

71A009	Micro Lynx System
71B007	M3 Machine Expansion Card
71B008	ACG-1 Digital Audio Clock Generator Card
71B009	ACG-2 Digital Audio Clock Card with AES/EBU
71B010	VSG Video Sync Generator Card

TimeLine Vista, Inc. reserves the right to change the design and specifications of equipment without notice.

# Notes

Applications

Introduction

Many different types of audio and video equipment are available. Before you configure your Console Control Unit (CCU) you should decide how your system will be setup, and where the CCU will be mounted in your console. With the help of our dealers and customers, we have selected some of the most common configurations used in the industry. Please use these as a guide for configuring your equipment to meet your specific application.

An efficient, high performance system depends upon the quality and compatibility of the equipment being used.

Related TimeLine Products

As you look through this chapter, keep some of our other products in mind. TimeLine products provide many solutions for your time code, controller, and synchronization requirements.

Keyboard Control Unit (KCU)
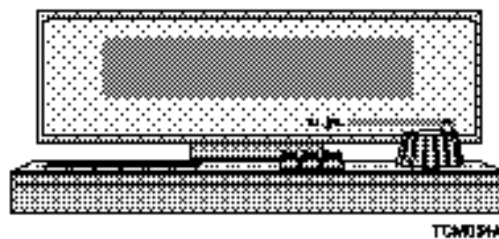
A powerful machine controller/editor for a wide range of multi-machine synchronization and audio editing, you can control up to six tape or film transports and two programmable GPI relay closures and six additional GPIs. You may operate any machine individually or any selection of available machines as a synchronized group, with any machine designated as the master.

Lynx System Supervisor
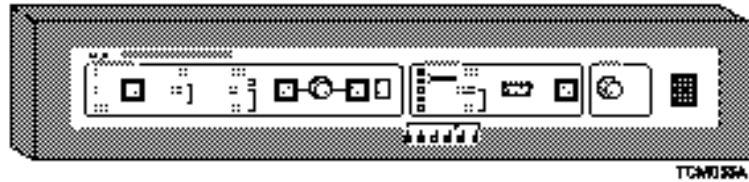
A System Supervisor (SSU) is *required* to operate one or more CCUs. The SSU provides console automation and audio post production, system integration. It brings an integrated system on-line with a limited amount of time and expense. All high-speed data communication for the entire system is handled with ease.

Lynx Film Module
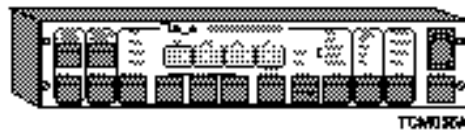
Interfaces pulse-interlock film transports with tape transports and editing systems. You can synchronize any film chain with any video or audio transport.

Lynx Time Code Module
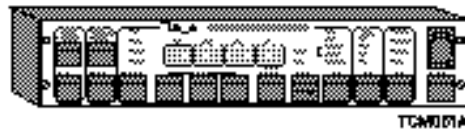
This is the main building block of the TimeLine synchronization and control system. Our new V500 software makes the module compatible with both stand-alone and controller dedicated units.

Use the Lynx as a high performance, time code synchronization and time code interface for audio video and DAT transports. It can operate as a time code reader, time code generator, synchronizer and resolver, or as an RS422 serial port.

Lynx SSL Data Interface for G Series Studio Computer

This is a special plug-compatible option, connecting the Lynx System Supervisor to operate from the SSL G Series console, allowing all operations to be controlled from the SSL console.

Micro Lynx System

Keyboard Controller (KBD)

Allows remote control of up to three machines plus MIDI. Used to enter editing and control parameters and status commands.

System Unit (SU)

Provides clock generator, time code generator, MIDI synchronizer, video sync, computer control ports, and GPI relays, as well as wide-band, high speed bi-directional time code reader.

Synchronizing Lynx in Chase Mode with a KCU
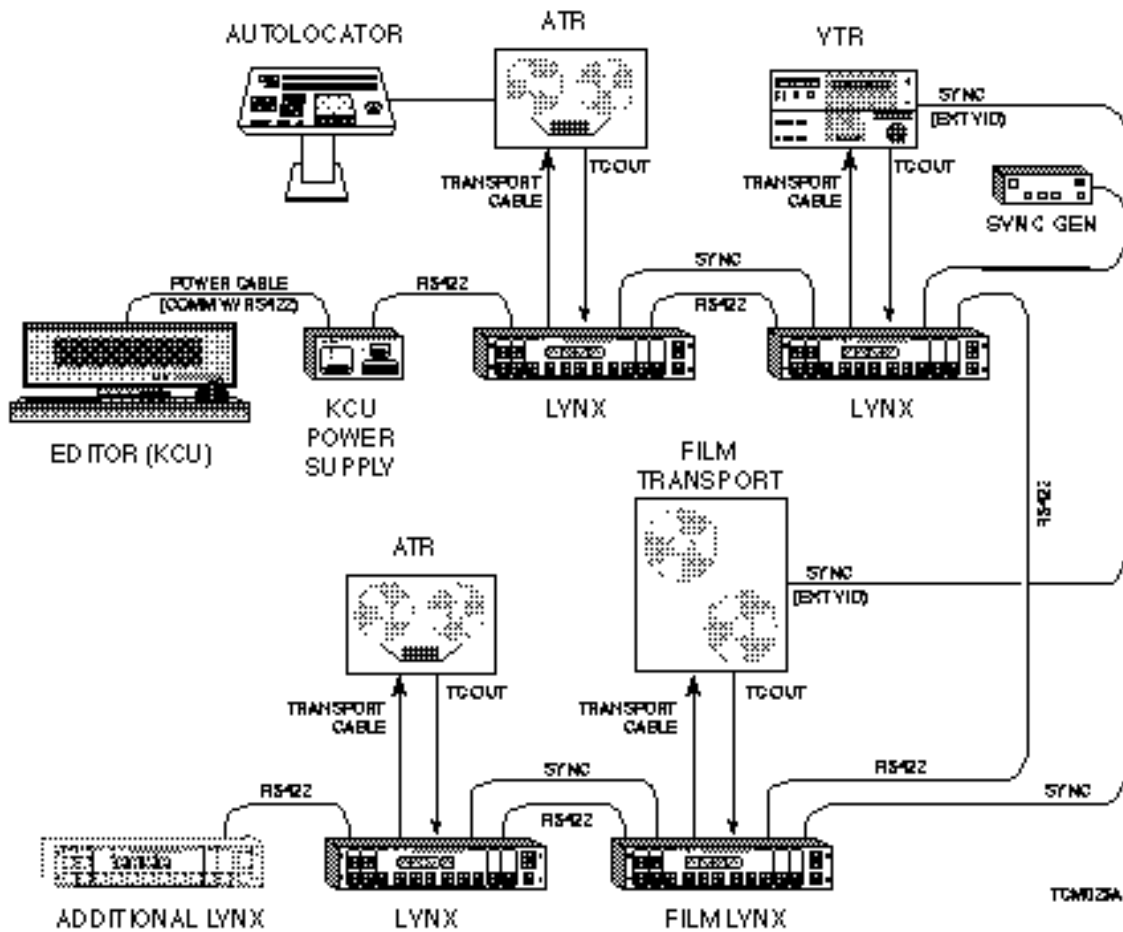
Figure 2-14. Synchronizing Lynx in Chase Mode with a KCU

Typical Uses   Typical applications include:

- Sound effects (prelay)
- Complex operations to picture
- Requirements for rapid entry of time code numbers
- Simple video editing
- Complex transfer applications
- Trim operations

Description

A KCU (Keyboard Control Unit) provides a convenient, fast way to perform Lynx functions. A Lynx module, without the KCU, can perform most of the following activities; entering offsets, setting real data entry points and entry numbers, selecting slew positions, selecting record tracks, establishing new positions quickly and then moving the tapes into position. However, many more key-strokes and some setup changes may be required.

If only some of these functions are desired, use the Console Control Unit (CCU) instead of the KCU.

Problems

If you are using External Video as a reference source, make sure that it provides a good, clean signal.

Post Production - Audio
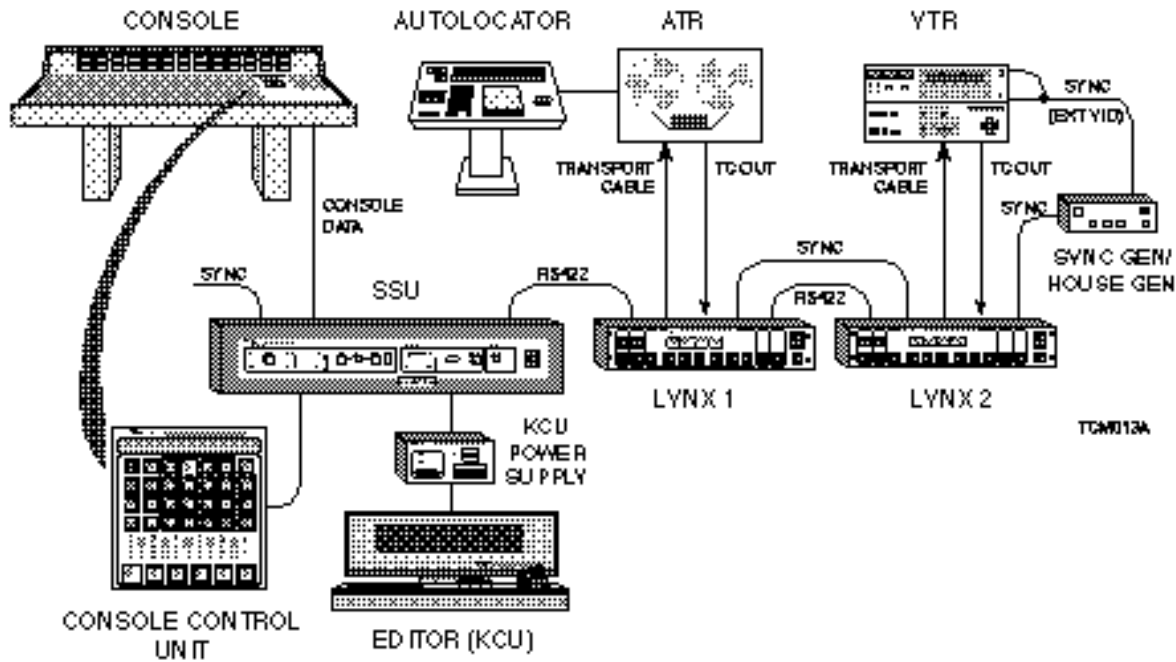
Figure 2-15. Post Production - Audio

Description

Lynx is compatible with numerous transports and types of console equipment. You can accurately control synchronization and mixing operations from a single place. Use the Lynx System Supervisor to connect multiple control units, and provide a direct software interface to many popular studio computer systems.

The CCU provides control for all basic control operations, such as track selection, group and solo modes, and register functions (preroll, post roll, in point, and offset). Several CCUs may be daisy chained for simultaneous local and remote operation.

Installation

Introduction

This chapter will help you install the Console Control Unit (CCU) hardware. The first part of the chapter describes the different hardware elements which must be considered. The second part of the chapter is an Installation Quick Check.

System Setup Planning

Before you install and configure your equipment, there are several installation issues to consider and plan.

Power
The CCU uses a DC power supply. You must connect and use the power supply that is shipped with the CCU. The CCU power supply should be plugged into a surge protected MAINS outlet.

Placement
The CCU is generally installed into the center section of the console. A TimeLine System Supervisor (SSU) is required to operate the CCU. The SSU is normally installed in the console automation computer rack.

Special hardware installation kits are available to mount the CCU in some consoles. Kits are available for:

> Neve V Series Consoles
> SSL Consoles
> Euphonic Consoles

Cabling
The CCU requires power, transport, and communications cables.

Quick Test
Before permanently mounting the CCU into your system, perform a quick check to verify operation and compatibility.
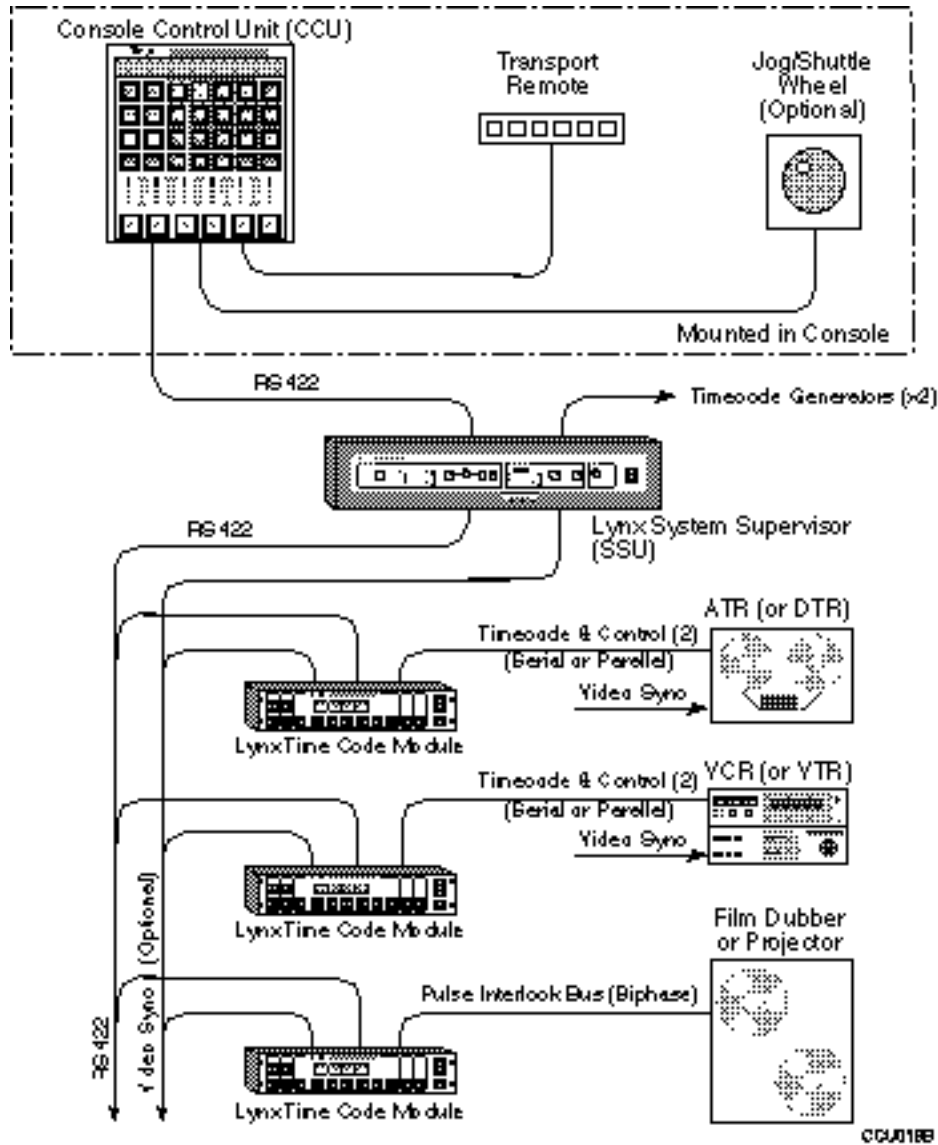
Figure 3-1. General Installation Block Diagram

Cable Installation

Careful connection and routing of cables for the CCU, System Supervisor (SSU), and console communications will ensure a quick and successful installation. The installation procedure has 3 steps:

1. Connect the Lynx modules to the transports and the System Supervisor.
2. Mount the CCU hardware.
3. Connect the CCU cables.

Power

Use the DC power supply provided with the CCU. Power supplies for the United States and Japan are specific for use in 110-120 VAC environments.

A switching power supply is used for 220-240 VAC environments. It will automatically adjust to the AC voltage in your area.

The power supply must be plugged into a surge protected MAINS outlet.

Fuses

The correct fuses are installed in the CCU by the factory. Fuse and voltage ratings are as follows:

Table 3-1. F1, +12 VDC Power Line Fuse

Country	Supply Voltage	Fuse Type
All	120/230 volts, AC mains	1/4 Amp, 250 volts, GMA

Table 3-2. F2, +5 VDC Power Line Fuse

Country	Supply Voltage	Fuse Type
All	120/230 volts, AC mains	1.5 Amp, 250 volts, GMA

To Change the Fuses:

PROCESSOR BOARD
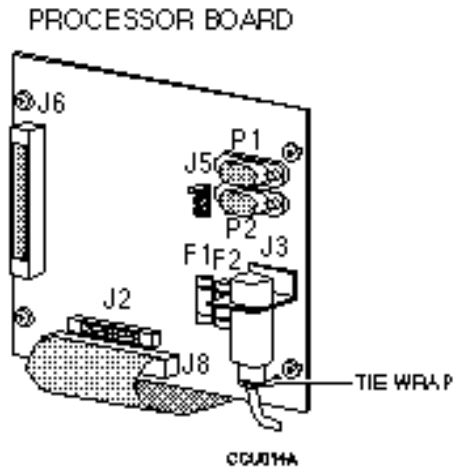
Figure 3-2. CCU Fuse Location (F1, F2)

1. Unplug the CCU DC power supply from the AC power source.

2. Unscrew and remove the console mounting panel.

3. Turn the panel over so that the underside is exposed.

4. Refer to Figure 3-2 and locate the two fuse holders (F1 and F2) next to the Power input on the CCU processor board.

5. Use a small screwdriver and gently pop the fuse out of the fuse holder.

6. Check the fuse rating against the chart. Replace the fuse, press securely into place.

7. Reconnect the CCU power supply.

8. Replace and secure the console mounting panel.

Connect Lynxes, Transports, and the System Supervisor
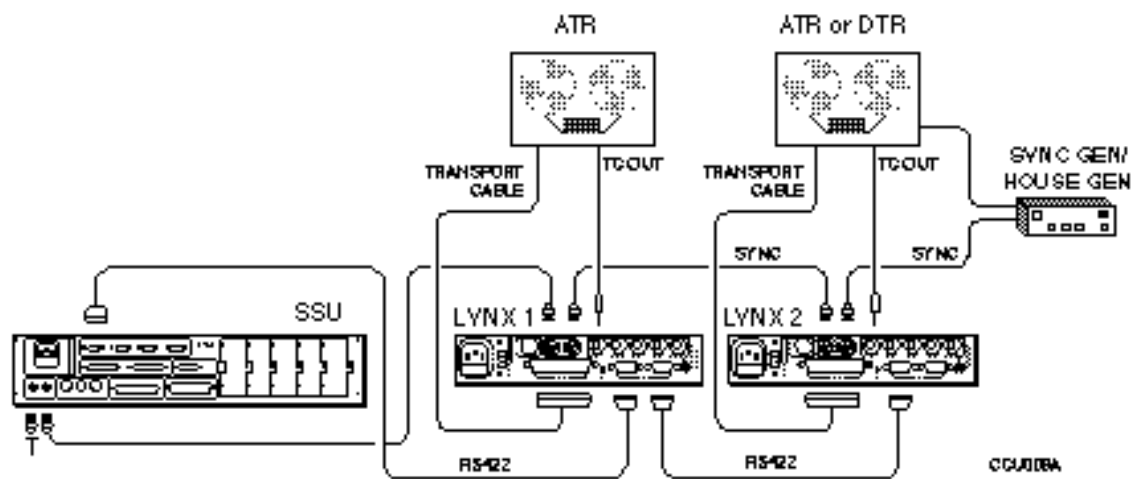
Figure 3-3. Connect Lynxes, Transports, and the System Supervisor

Each transport must be connected to a Lynx Module. The Lynx modules are connected to the System Supervisor. Specific interconnection instructions for the Lynx modules, transports, and System Supervisor are located in their respective manuals.

Procedure

1. Connect the 50-pin transport cable to the Lynx **TRANSPORT** jack and the transport. Initialize each module for its specific transport.

   Initialization procedures for the Lynx module are located in the Getting Started chapter of the Lynx Operating Manual (V500)

2. Connect the 1/4" stereo time code cable from the Lynx **TC OUT** jack to the transport.

3. Daisy-chain the 9-pin RS422 cables between the Lynx modules, and the System Supervisor (SSU), **TRIB PORT 1**.

4. Daisy-chain the sync source/external video cable (BNC) between the Lynx modules (transports if required), and the System Supervisor (SSU).

   If the SSU provides the video sync source, daisy-chain the sync cables from the SSU to the Lynx modules.

Mount the CCU in the Console
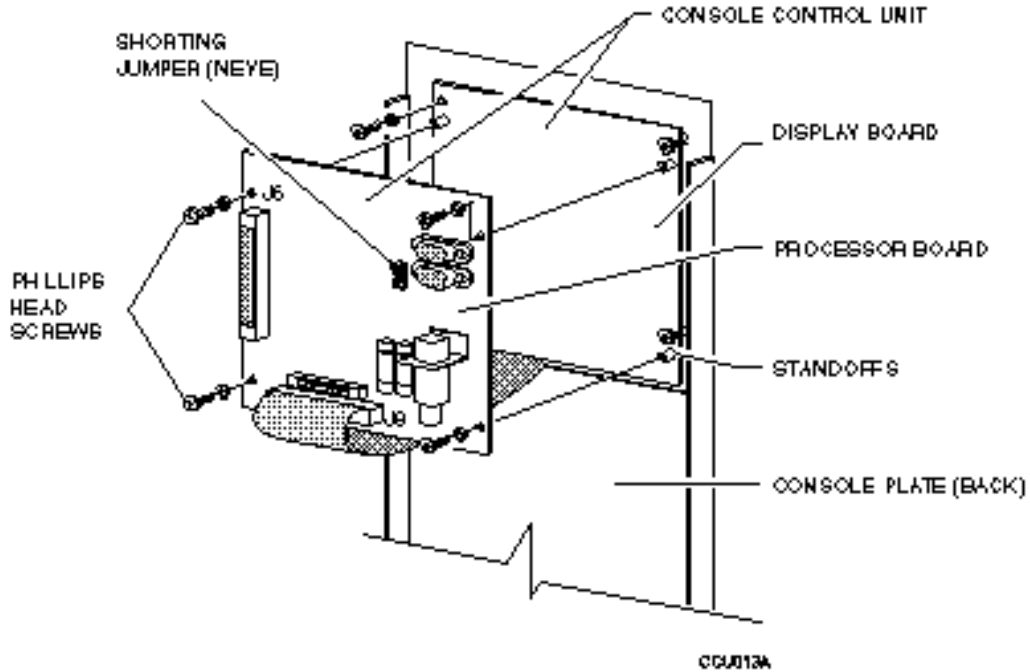
Figure 3-4. CCU Mounting Hardware

The CCU comes with a general installation kit which includes the following items:

1   AC to DC Power Supply
1   CCU
1   RS422 Cable
1   Hardware mounting kit

If you ordered the CCU with a specific console installation kit: Neve, SSL, or Euphonix, there will be installation components and instructions that are specific to the console.

Procedure

1. Remove the hardware holding the peripheral equipment plate on your Console face plate.

    If there are no prepunched areas for adding peripheral equipment, please contact your dealer for a new face plate.

2. Place the CCU packing materials on your console for protection. Fold the Console face plate back over the top of the console.

3. Mount the CCU onto the console plate.

    a. Remove the four phillips head screws holding the two CCU printed circuit boards together.

    b. Disconnect the ribbon cable between the processor and Display boards.

    c. Expose the Display board. Place the Processor board on a static safe work surface.

    d. Lay the Display board into position on the CCU control panel. Line up the 4 mounting holes on the Display board with the existing Console face plate mounting standoffs or bolts and spacers that have been installed to match the hardware template. The hardware template is located in the Appendix in the back of this manual.

    e. Insert the four mounting screws into the Control Console face plate and tighten.

    f. Place the CCU Processor board onto the Display board (backs or soldered sides together).

    g. Replace and tighten the four phillips screws which hold the two boards together.

    h. Reattach the ribbon cable that connects the CCU Processor (J8) and Display boards. When attaching the ribbon cable, verify that the connector is correctly seated. Improper seating may leave bent or exposed pins.

Connect the CCU Cables

Once the hardware is correctly and securely installed, connect the cables to the CCU. There are two cables to be connected.

1. Power cable

2. Serial communications cable to SSU

Procedure
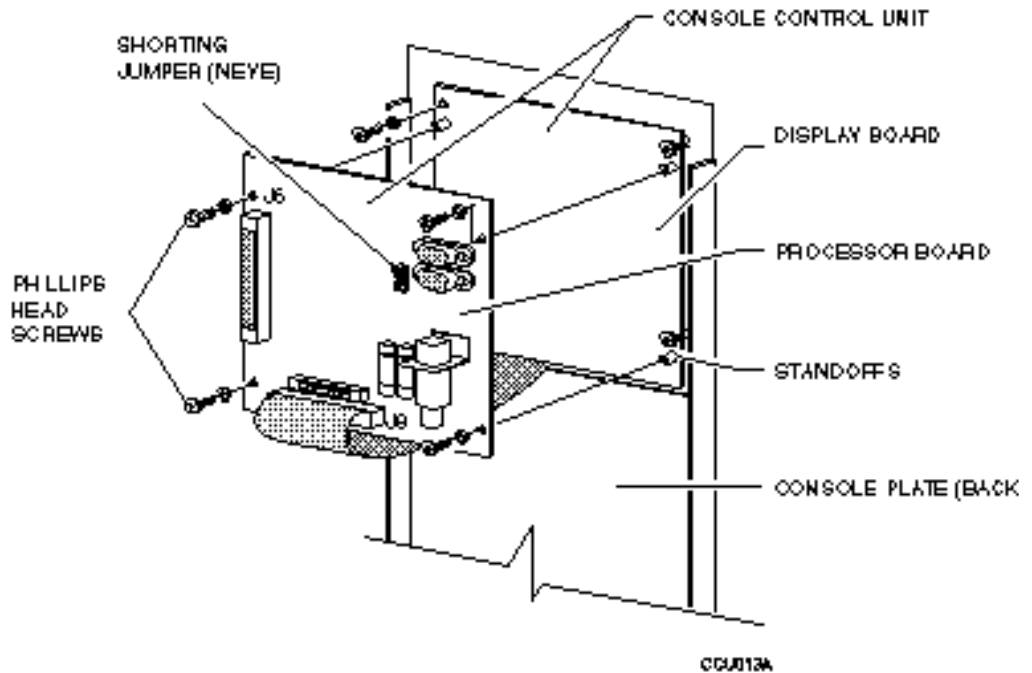
Figure 3-5. Cable Connections

Power Cable

1. Insert the DIN type connector from the CCU power supply to J3 on the CCU processor board.

2. Pass a tie-wrap through the holes on the CCU Processor circuit board and around the DIN connector. Refer to Figure 3-2 for location. Tighten the tie-wrap.

3. Although installation of the tie-wrap is optional, it will provide strain-relief for your cable and make it less susceptible to breaking.

Serial Interface (RS422) Cable to the System Supervisor.

1. Insert the DB-9 end of the TimeLine supplied RS422 cable into connector P1 on the CCU Processor board.

2. Insert the DB-25 end of the RS422 cable into the Keyboard/Computer Control Port 1 on the System Supervisor.

Table 3-3. Serial Interface Cable Pinouts

Pin No.	P1, 9-pin	Pin No.	P2, 25-pin
1	Shield		
2	SERIAL DATA RECEIVE -	15	SERIAL DATA RECEIVE -
3	SERIAL DATA TRANSMIT +	1	SERIAL DATA TRANSMIT +
4	GND	10	GND
5	FRAME CLOCK	6	FRAME CLOCK
6	NC		
7	SERIAL DATA RECEIVE +	2	SERIAL DATA RECEIVE +
8	SERIAL DATA TRANSMIT -	14	SERIAL DATA TRANSMIT -
9	NC		

Motion Control Interface Option

Console or remote motion control switches may be connected to the CCU. Use connector J6 on the CCU Processor Board to provide an interface between the TimeLine Motion Control Bank and the CCU. Use Table 3- 3 to build a cable on a 40-pin header if you are using a different Motion Control Switch matrix and Figure 3-4 to install the header.

Table 3-4. Motion Control Interface Connector Pinouts

Pin	Signal	Pin	Signal
1	Rewind Switch	2	Rewind Return Switch
3	NC	4	NC
5	Fast Forward Switch	6	Fast Forward Return Switch
7	NC	8	NC
9	NC	10	NC
11	Play Switch	12	Play Return Switch
13	NC	14	NC
15	Stop Switch	16	Stop Return Switch
17	NC	18	NC
19	Record Switch	20	Record Return Switch
21	NC	22	NC
23	Rewind Lamp	24	Rewind Return Lamp
25	Fast Forward Lamp	26	Fast Forward Return Lamp
27	Stop Lamp	28	Stop Return Lamp
29	Play Lamp	30	Play Return Lamp
31	Record Lamp	32	Record Return Lamp
33	Reset	34	Spare
35	Serial Clock	36	Spare
37	Serial Out Data	38	Spare
39	Serial Strobe	40	+5V

Warning

The lamps in the Motion Control keys must be replaced in order for the CCU to control them. Replacement lamps must be 12 V, max 40 mA.

Jog/Shuttle Option

A Jog/Shuttle wheel may be connected to the CCU. Use Connector J2
on the CCU to connect the Jog wheel. Use
Table 3-5 to build a cable. Connector J2 should be wired
as follows:

Table 3-5. Jog/Shuttle Option Pinouts

Pin No.	Signal Description
1	Encoder A (signal input)
2	Encoder B (signal input)
3	Encoder Common (ground)
4	Jog Switch
5	Shuttle Switch
6	Loop Switch
7	Jog Tally
8	Shuttle Tally
9	Loop Tally
10	+12 V
11	Ground
12	Ground
13	Ground
14	+5 V
15	+5 V
16	NC

Secure the CCU

Once all of the cables are in place, secure the CCU in the Console. Perform the Quick Test procedures described in the next section of this chapter.

Cable Check List

Between Equipment	Connectors	From / To
Lynx to Transport	50-pin, 'D'	Lynx TRANSPORT jack to Transport
Lynx to Transport	1/4" to 1/4" stereo	Lynx TIME CODE OUT to Transport Time Code In
Lynx to SSU	9 to 9 pin, 'D'	RS422 to SSU Trib Port #1
Sync to all equipment	BNC	Lynx EXT VID to SSU EXT VID to Transport
CCU	40-pin, 'D'	J8 CCU Processor Board to CCU Display Board
CCU to Power Supply	5-pin DIN	J3 (Processor Board) to Power Supply
CCU to SSU	9 to 25 pin, 'D'	P1 (Processor Board) to Control Port 1 (SSU)

Procedure

1. Gently lift up the console panel and place it back into position.

2. Replace any mounting hardware that might have been removed to install the CCU.

3. Turn on the power.

Quick Test Procedures

These test procedures are designed to test the ability of the different pieces of equipment to communicate with each other. Upon completing these procedures, you will be ready to run the system.

There are three parts to this test, each must be completed before continuing to the next part.

Procedure to Verify that the SSU Turns On

Press/Turn	You See	Description
1.		MAINS Turn on the SSU. The start up test is automatically performed. During the startup test most of the LEDs and keys should light.
	all LEDs *but* **XMT DATA** and **RCV DATA** turn on	The start up LED test ends after 30 seconds.
2.	**EXT VID** LED on **PROC 1** LED on **PROC 2** LED on **PROC 3** LED on	Other LEDs may be turned on, ONLY the LEDs listed here are significant. If EXT VID is not supplied, **EXT VID** will be flashing.

Table 3-6. What if the SSU doesn't turn on correctly?

Situation	*Solution*	*Conditions*
The SSU does not turn on.	1. Verify that the power cord is securely connected. 2. Check the fuse.	Refer to the SSU manual for fuse rating and changing information.

Some or all of the LEDs do not turn on when initially powering up the SSU.	1. Clear the SSU memory:
	    Hold the SELECT key while turning the power
	    switch off then on.
	2. Call the factory.	

Note
The EXT VID may flash, this is a normal condition which indicates that the external video reference is not present. If a valid signal is connected, the LED will stop flashing.

Procedure to Verify That the CCU and SSU Can Communicate

Press/Turn	You See	Description
On the CCU		
3.		Turn on the CCU.
	Holding memory	Each line is displayed for approximately 2 seconds
	TimeLine	then the next line is displayed. **GRP** will flash
	Version #.##	To clear the CCU memory, press **SETUP** + **CLR.**
	Ref Src Ext vid	
	Poll: Grp + Setup	
On the SSU		
4. **SELECT**	**SELECT** on	This LED is located in the Diagnostic section of
	DIAG ON LED on	the SSU front panel.
5. Turn select knob	**CTRL PORT 1** LED on	Turn the Select knob until the **CTRL PORT 1** LED turns on.
	DIAG ON LED on	When **CTRL PORT 1** LED turns on, these LEDs on the CCU will light.
	MSG OK LED on	Pay close attention to the **RCV DATA** and **XMT DATA** LEDs.
	BREAK LED on	
	RCV DATA	LED flickers
	XMT DATA	LED flickers

Table 3-7. What if the SSU doesn't communicate with the CCU?

Situation	*Solution*	*Conditions*
The **RCV** and **XMT DATA** LEDs do not flicker,	Check the cable connections and refer to the System Supervisor Operating Manual.	The CCU must be turned on.
The CCU and SSU just don't communicate	Check the cable connections. Is the power turned on, re-cycle power switch (off-on-)	The CCU must be turned on.

Procedure to Verify That the SSU and Lynx(es) Can Communicate

Press/Turn	You See	Description
On the Lynx		
6.		Turn on all Lynx modules.
On the SSU		
7. Turn select knob	**TRIB PORT** LED on 1 (in the display)	Turn the Select Knob until a 1 is displayed in the LED display window to the right of the **AUX SELECT** key and the **TRIB PORT** LED turns on.
	DIAG ON LED on **RCV DATA** LED flickers **XMT DATA** LED flickers	When the **TRIB PORT** LED turns on, these LEDs will turn on also If the **RCV** and **XMT** DATA LEDs do not flicker, check the cable connections and refer to the System Supervisor Operating Manual.
8.		The Lynx modules are communicating with the SSU.
9. **GRP + SETUP**	**A-F** flashing	Let the CCU poll the Lynx units. At this time each Lynx is automatically assigned to a machine select key by the CCU. Each machine select key that is flashing indicates has a Lynx is assigned to it.
10. **GRP** + [**A-F**]	**A-F** light on machine select letter.	Assign one or more machines to the group by pressing **GRP** and the

Table 3-8. What if the SSU doesn't communicate with the Lynx(es)?

Situation	*Solution*	*Conditions*
A 2 instead of a 1 is displayed.	Press the **AUX SELECT** key until a 1 is displayed	This test must be performed on TRIB PORT 1 not TRIB PORT 2.
The **RCV** and **XMT DATA** LEDs do not flicker	The CCU must be turned on before the Lynx Verify that the Lynx is "On line" Verify that each Lynx has a unique address.	CCU to SSU communications must be established before Lynx to SSU communications. If you turn off the units, turn the CCU back on first. If you change the Lynx modules or their setup, you must repoll the CCU (press **GRP** + **SETUP**).
Lynx(es) and SSU do not communicate.	Check the cables, especially the daisy-chained **RS422**. Verify that each Lynx has a unique address.	LYNX: Is the **422** LED turned on? Are the Lynx addresses correctly set? Each Lynx must be set to a unique address. CCU: Press **GRP** + **SETUP** to repoll.
Pressing **GRP** + **POLL** shows **GRP** & a letter, then defaults back to **GRP** + **POLL**	Two of the Lynx modules are set to the same address. Each Lynx *MUST* have a unique address.	After changing a Lynx address, you must repoll by pressing GRP + POLL. Any Lynx address or module change requires repolling by the CCU.

Verify CCU - Motion Control Keys Communication

If you installed the Motion Control option, verify that the Motion Control keys can control a selected transport.

Procedure

This portion of the procedure is performed on the Motion Control Keys. Solo each of the machines being controlled by the CCU. Perform steps 11-14 for each machine. Then select the group and perform steps 18-19.

Press/Turn	You See	Description
Solo mode		
11. **SOLO** A	**SOLO** light on A light on	The machine select key of the machine will turn on. To select a The tape machine assigned to A will run.
` **SOLO** + **B**	**B** light on	To select a different machine, press the appropriate machine select key while pressing **SOLO**.
12. PLAY	Time code CODE LED on	Press PLAY on the motion control keys. Time code should be read and displayed by the CCU and Lynx.
13. >> (Fast Forward)		Tape machine should fast forward.
14. STOP		Tape machine stops and no time code is read.
15.		Repeat steps 11-14 for each machine select key assigned to a transport. When all individual machines have been tested, check group mode.
Group mode		
16. **GRP** **A B C**	**GRP** light on **A B C** lights on	Select group mode and which machines will be part of the group.
17.		Perform steps 11-14.

Table 3-9. What if the Motion Control Keys don't control a transport?

Situation	*Solution*	*Conditions*
The busy LED on the CCU flashes	Turn the associated Lynx module "On line".	The Lynx, SSU, and CCU must all be turned on.
Time code is not displayed in PLAY.	Verify the Lynx to transport cabling.	The transport cable, RS422, and TCIN cables must be properly seated.
Motion control keys do not correctly put the transport into PLAY, Fast Forward, or STOP.	Check the CCU to Motion Control Keys cable; is it correctly oriented & properly inserted. Verify that the Lynx is setup for the correct transport.	Other peripheral equipment attached to the motion control keys must be connected to the 'Y' on the CCU to Motion Control Keys.

Neve Installation

Prepare the CCU for the Neve Console

The Neve Hardware Mounting Kit includes the following:

4 screws	1 cable tie
5 lamps	1 shorting bar
1 40 pin ribbon cable	

1. In your hardware kit, you received a shorting bar. Place it between pins 1 and 2 on J5 which is located on the CCU Processor board.
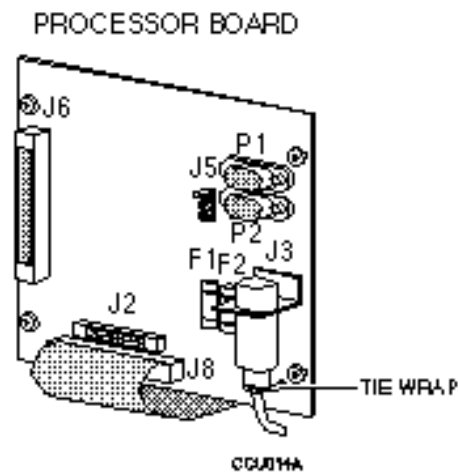
Figure 3-6 Bach View of the CCU

2. Turn over the Console Control panel. Gently remove the 5 motion keycap covers: >>, <<, >, **STOP**, and **RECORD**.

3. Use a small slotted screwdriver and right-angled needle nose pliers to remove the lamp bulbs. Insert the lamp bulbs supplied in your hardware kit. The Rollback and Locate keys can not be lit by the CCU, so these lamp bulbs will not be replaced.

Note

The CCU uses 12 VDC instead of 24 VDC. Your motion control push buttons will only operate correctly if you replace the lamps with 12 V, 40ma bulbs.

Procedure

1. Remove the hardware holding the peripheral equipment plate on your Console face plate.

   If there are no prepunched areas for adding peripheral equipment, please contact your dealer for a new face plate.

2. Place the CCU packing materials on your console for protection. Fold the Console face plate back over the top of the console.

3. Mount the CCU onto the console plate.

   a. Remove the four phillips head screws holding the two CCU printed circuit boards together.

   b. Disconnect the ribbon cable between the processor and Display boards.

   c. Expose the Display board. Place the Processor board on a static safe work surface.

   d. Lay the Display board into position on the CCU control panel. Line up the 4 mounting holes on the Display board with the existing Console face plate mounting standoffs or bolts and spacers that have been installed to match the hardware template. The hardware template is located in the Appendix in the back of this manual.

   e. Insert the four mounting screws into the Control Console face plate and tighten.

   f. Place the CCU Processor board onto the Display board (backs or soldered sides together).

   g. Replace and tighten the four phillips screws which hold the two boards together.

   h. Reattach the ribbon cable that connects the CCU Processor (J8) and Display boards. When attaching the ribbon cable, verify that the connector is correctly seated. Improper seating may leave bent or exposed pins.

Connect the CCU Cables

CONSOLE CONTROL UNIT

CONSOLE FACE PLATE

TO SSU
KEYBOARD/COMPUTER
CONTROL PORT #1

J6

OPTIONAL
JOG WHEEL

DISPLAY TO
PROCESSOR
BOARD

POWER
AC - DC

CONSOLE
CONTROL
CABLE

TO NEVE COMPUTER
KEYBOARD

NEVE TAPE/KEYBOARD
CONTROLLER

CN6

CCU010B

TO OTHER
MOTION KEY
PERIPHERALS

Figure 3-7. Cable Connections

Once the hardware is correctly and securely installed, connect the cables to the CCU. There are two cables to be connected.

1. Power cable

2. Serial communications cable to SSU

3. J6, Motion Control Cable

Procedure

Power Cable

1. Insert the DIN type connector from the CCU power supply to J3 on the CCU processor board.

2. Pass a tie-wrap through the holes on the CCU Processor circuit board and around the DIN connector. Refer to Figure 3-2 for location. Tighten the tie-wrap.

3. Although installation of the tie-wrap is optional, it will provide strain-relief for your cable and make it less susceptible to breaking.

Serial Interface (RS422) Cable to the System Supervisor.

1. Insert the DB-9 end of the TimeLine supplied RS422 cable into connector P1 on the CCU Processor board.

2. Insert the DB-25 end of the RS422 cable into the Keyboard/Computer Control Port 1 on the System Supervisor.

Neve Motion Control Cable

1. Connect the 40-pin ribbon cable between the CCU and the Neve motion keys as shown in Figure 3-7.

    a. If a cable is connected to CN6 on the Neve Control panel, remove it.

    b. Insert the keyed end of the TimeLine supplied 50-pin cable into J6, the Motion Control Interface connector on the CCU.

    c. Approximately 3 inches from the connector fold the ribbon cable back over the top of the connector.

    e. At the fold bend the cable back at a 45 degree angle so that it will lay flat and route directly to connector CN6 on the Neve control board.

    f. Attach the middle connector on the TimeLine supplied 40-pin cable into CN6 on the Neve Control board.

    g. Attach any 40-pin cables that were formerly attached to CN6 on the Neve Control board to the remaining 40-pin connector on the TimeLine supplied cable.

2. Verify that the 40 pin ribbon cable between the CCU   Display and Processor boards is still securely attached.

Connect the CCU to a Neve Console

NEVE COMPUTER (BACK)

CCU

KBD

SMPTE

NEVE TC CABLE

TO NEVE COMPUTER KEYBOARD

SSU SERIAL CABLE

SSU TC CABLE

NEVE PANEL

SSU

CCU TO CONTROL PORT 1

CUSTOMER SUPPLIED

CCUDHA
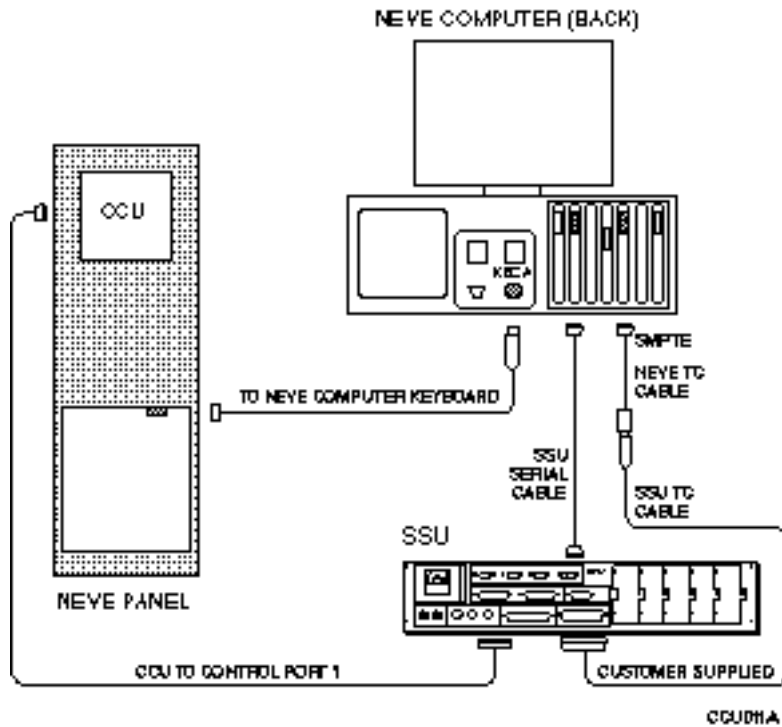
Figure 3-8. Connect the CCU to a Neve Console

The Neve Console is computer controlled. The CCU requires two cables connected between the SSU and the Neve computer for communications.

Procedure

Verify Installation of the Motion Control Cable

1. On the back of the console control panel, where you installed the CCU, locate CN1, a 6-pin right angle connector, on the Neve Console Control board.

2. Verify that the cable connector is securely attached.

3. Verify that the other end of the cable is securely plugged into the back of the Neve computer in the keyboard cable input labeled KECA as illustrated in Figure 3-8.

Install the Neve Serial Data Cable

1. Insert the customer supplied 9-pin serial data cable into the TCCA port on the back of the Neve computer.

2. Connect the Customer supplied 9-pin cable to the TimeLine supplied female DB9 connector.

3. Insert the male end of the DB9 9-pin serial data cable into Trib port # 4 on the back of the System Supervisor.

Install the Neve and SSU Time Code Cable

1. Insert the Neve Time Code 9-pin cable into the SMPTE port on the back of the Neve computer.

2. Use the SSU Time Code cable and insert the DB37 connector into the Audio I/O port on the back of the System Supervisor.

3. Connect the 9-pin side of the SSU Time Code cable into the 9-pin Neve Time Code cable.

Secure the CCU

Once all of the cables are in place, secure the CCU in the Console. Perform the Quick Test procedures described in the next section of this chapter.

Cable Check List

Between Equipment	Connectors	From / To
Lynx to Transport	50-pin, 'D'	Lynx TRANSPORT jack to Transport
Lynx to Transport	1/4" to 1/4" stereo	Lynx TIME CODE OUT to Transport Time Code In
Lynx to SSU	9 to 9 pin, 'D'	RS422 to SSU Trib Port #1
Sync to all equipment	BNC	Lynx EXT VID to SSU EXT VID to Transport
CCU	40-pin, 'D'	J8 CCU Processor Board to CCU Display Board
CCU to Power Supply	5-pin DIN	J3 (Processor Board) to Power Supply
CCU to SSU	9 to 25 pin, 'D'	P1 (Processor Board) to Control Port 1 (SSU)

Procedure

1. Gently lift up the console panel and place it back into position.

2. Replace any mounting hardware that might have been removed to install the CCU.

3. Turn on the power.

Quick Test Procedures

These test procedures are designed to test the ability of the different pieces of equipment to communicate with each other. Upon completing these procedures, you will be ready to run the system.

There are three parts to this test, each must be completed before continuing to the next part.

Procedure to Verify that the SSU Turns On

Press/Turn	You See	Description
1. MAINS		Turn on the SSU. The start up test is automatically performed. During the startup test most of the LEDs and keys should light.
	all LEDs *but* **XMT DATA** and **RCV DATA** turn on	The start up LED test ends after 30 seconds.
2.	**EXT VID** LED on **PROC 1** LED on **PROC 2** LED on **PROC 3** LED on	Other LEDs may be turned on, ONLY the LEDs listed here are significant. If EXT VID is not supplied, **EXT VID** will be flashing.

Table 3-10. What if the SSU doesn't turn on correctly?

Situation	*Solution*	*Conditions*
The SSU does not turn on.	1. Verify that the power cord is securely connected. 2. Check the fuse.	Refer to the SSU manual for fuse rating and changing information.
Some or all of the LEDs do not turn on when initially powering up the SSU.	1. Clear the SSU memory: Hold the SELECT key while turning the power switch off then on. 2. Call the factory.	

Note

The EXT VID may flash, this is a normal condition which indicates that the external video reference is not present. If a valid signal is connected, the LED will stop flashing.

Procedure to Verify That the CCU and SSU Can Communicate

Press/Turn	You See	Description

On the CCU

3.		Turn on the CCU.
	Holding memory	Each line is displayed for approximately 2 seconds
	TimeLine	then the next line is displayed. **GRP** will flash
	Version #.##	To clear the CCU memory, press **SETUP** + **CLR.**
	Ref Src Ext vid	
	Poll: Grp + Setup	

On the SSU

| 4. **SELECT** | **SELECT** on | This LED is located in the Diagnostic section of |
| | **DIAG ON** LED on | the SSU front panel. |

| 5. Turn select knob | **CTRL PORT 1** LED on | Turn the Select knob until the **CTRL PORT 1** LED turns on. |

| | **DIAG ON** LED on | When **CTRL PORT 1** LED turns on, these LEDs on the CCU will |
light. | | **MSG OK** LED on Pay close attention to the **RCV DATA** |
and **XMT DATA** LEDs. | | |

	BREAK LED on	
	RCV DATA LED flickers	
	XMT DATA LED flickers	

Table 3-11. What if the SSU doesn't communicate with the CCU?

Situation	*Solution*	*Conditions*
The **RCV** and **XMT DATA** LEDs do not flicker,	Check the cable connections and refer to the System Supervisor Operating Manual.	The CCU must be turned on.
The CCU and SSU just don't communicate	Check the cable connections. Is the power turned on, re-cycle power switch (off-on-)	The CCU must be turned on.

Procedure to Verify That the SSU and Lynx(es) Can Communicate

Press/Turn	You See	Description
On the Lynx		
6.		Turn on all Lynx modules.
On the SSU		
7. Turn select knob	**TRIB PORT** LED on 1 (in the display)	Turn the Select Knob until a 1 is displayed in the LED display window to the right of the **AUX SELECT** key and the **TRIB PORT** LED turns on.
	DIAG ON LED on **RCV DATA** LED flickers **XMT DATA** LED flickers	When the **TRIB PORT** LED turns on, these LEDs will turn on also If the **RCV** and **XMT** DATA LEDs do not flicker, check the cable connections and refer to the System Supervisor Operating Manual.
8.		The Lynx modules are communicating with the SSU.
9. **GRP** + **SETUP**	**A-F** flashing	Let the CCU poll the Lynx units. At this time each Lynx is automatically assigned to a machine select key by the CCU. Each machine select key that is flashing indicates has a Lynx is assigned to it.
10. **GRP** + [**A-F**]	**A-F** light on machine select letter.	Assign one or more machines to the group by pressing **GRP** and the

Table 3-12. What if the SSU doesn't communicate with the Lynx(es)?

Situation	*Solution*	*Conditions*
A 2 instead of a 1 is displayed.	Press the **AUX SELECT** key until a 1 is displayed	This test must be performed on TRIB PORT 1 not TRIB PORT 2.
The **RCV** and **XMT DATA** LEDs do not flicker	The CCU must be turned on before the Lynx Verify that the Lynx is "On line" Verify that each Lynx has a unique address.	CCU to SSU communications must be established before Lynx to SSU communications. If you turn off the units, turn the CCU back on first. If you change the Lynx modules or their setup, you must repoll the CCU (press **GRP** + **SETUP**).
Lynx(es) and SSU do not communicate.	Check the cables, especially the daisy-chained **RS422**. Verify that each Lynx has a unique address.	LYNX: Is the **422** LED turned on? Are the Lynx addresses correctly set? Each Lynx must be set to a unique address. CCU: Press **GRP** + **SETUP** to repoll.
Pressing **GRP** + **POLL** shows **GRP** & a letter, then defaults back to **GRP** + **POLL**	Two of the Lynx modules are set to the same address. Each Lynx *MUST* have a unique address.	After changing a Lynx address, you must repoll by pressing GRP + POLL. Any Lynx address or module change requires repolling by the CCU.

Verify CCU to Neve Computer Communication

This step verifies the ability of the Neve Computer to control the CCU.

Procedure

This portion of the procedure is performed on the Neve computer. Before starting, confirm that the cable from the console motion contol keys to the back of the Neve computer is securely connected.

Press/Turn	You See	Description
11.		On the Neve computer enter the Neve Flying Faders program.

On the System Supervisor (SSU)

12. SELECT SELECT KNOB	**TRIB PORT 4** LED on **RCV DATA** LED flickers **XMT DATA** LED flickers **MSG OK** LED flickers	Select Trib Port 4 on the SSU. Neve is communicating through a serial port to the SSU.

On the Console Motion Keys

13. PLAY	Time code	The tape machine should start rolling. You should see time code on both the CCU and Neve computer displays . This verifies that signals through the SMPTE connector are being correctly ported to the SSU.

Table 3-13. What if the Neve computer doesn't communicate?

Situation	Solution	Conditions
Time code is not displayed in PLAY.	Verify the Lynx to transport cabling.	The transport cable and RS422 cables must be properly seated.
SSU doesn't respond correctly.	Check the SMPTE and TCCA cable connections on the Neve computer	
The tape machine doesn't play.	Check the cabling between the motion control keys and the Neve computer	

Verify CCU - Motion Control Keys Communication

If you installed the Motion Control option, verify that the Motion Control keys can control a selected transport.

Procedure

This portion of the procedure is performed on the Motion Control Keys. Solo each of the machines being controlled by the CCU. Perform steps 11-14 for each machine. Then select the group and perform steps 19-20.

Press/Turn	You See	Description
Solo mode		
14. **SOLO** A	**SOLO** light on A light on	The machine select key of the machine will turn on. To select a The tape machine assigned to A will run.
` **SOLO + B**	**B** light on	To select a different machine, press the appropriate machine select key while pressing **SOLO**.
15. PLAY	Time code CODE LED on	Press PLAY on the motion control keys. Time code should be read and displayed by the CCU and Lynx.
16. >> (Fast Forward)		Tape machine should fast forward.
17. STOP		Tape machine stops and no time code is read.
18.		Repeat steps 11-14 for each machine select key assigned to a transport. When all individual machines have been tested, check group mode.
Group mode		
19. **GRP** **A B C**	**GRP** light on **A B C** lights on	Select group mode and which machines will be part of the group.
20.		Perform steps 11-14.

Table 3-14. What if the Motion Control Keys don't control a transport?

Situation	Solution	Conditions
The busy LED on the CCU flashes	Turn the associated Lynx module "On line".	The Lynx, SSU, and CCU must all be turned on.
Time code is not displayed in PLAY.	Verify the Lynx to transport cabling.	The transport cable, RS422, and TCIN cables must be properly seated.
Motion control keys do not correctly put the transport into PLAY, Fast Forward, or STOP.	Check the CCU to Motion Control Keys cable; is it correctly oriented & properly inserted. Verify that the Lynx is setup for the correct transport.	Other peripheral equipment attached to the motion control keys must be connected to the 'Y' on the CCU to Motion Control Keys.

NOTES

TimeLine

❑ OPTIONAL

❑ RECOMMENDED

☑ MANDATORY

NEVE/CCU Installation

DATE: 07/25/94

MODEL: Console Control Unit

REVISION: All

SERIAL NO: All

SOFTWARE: CCU 230 and later
SSU 140 and later

DESCRIPTION:

An update is required in the Neve Flying Faders configuration file. This update improves CCU performance in Neve/SSU installations.

PROCEDURE:

Part 1: Flying Faders Computer

Note: We recommend that these changes be made by someone who is familiar with DOS computer systems.

1. Exit from the Flying Faders program on the Flying Faders Computer, to the DOS prompt.

2. With a text editor, add the following lines to the end of the Neve Configuration File: **C:\mfsys\mfad.ini**.

    ## TimeLine CCU/SSU System Configuration
    ## Note: This section must be removed if the SSU is disconnected.
    ## Enable Transport control
    set tapeismast true
    ## Disable External Transport Control Buttons
    tape rewind off
    tape forward off
    tape play off
    tape stop off

Part 2: CCU

1. Turn off the CCU and remove the jumper between pins 1 and 2 of CCU Header J5.

2. Power up the CCU while holding the CLR Key to reset the CCU.

3. Under [SETUP] + [SYS] on the CCU, check that control Via is set to DIRECT.
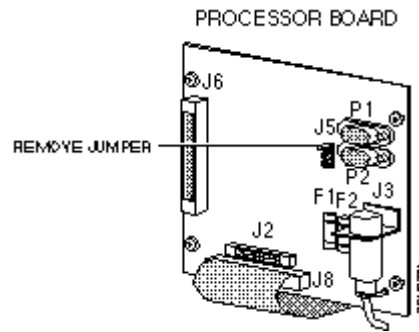
Figure 1. Jumper Location

Features and Controls
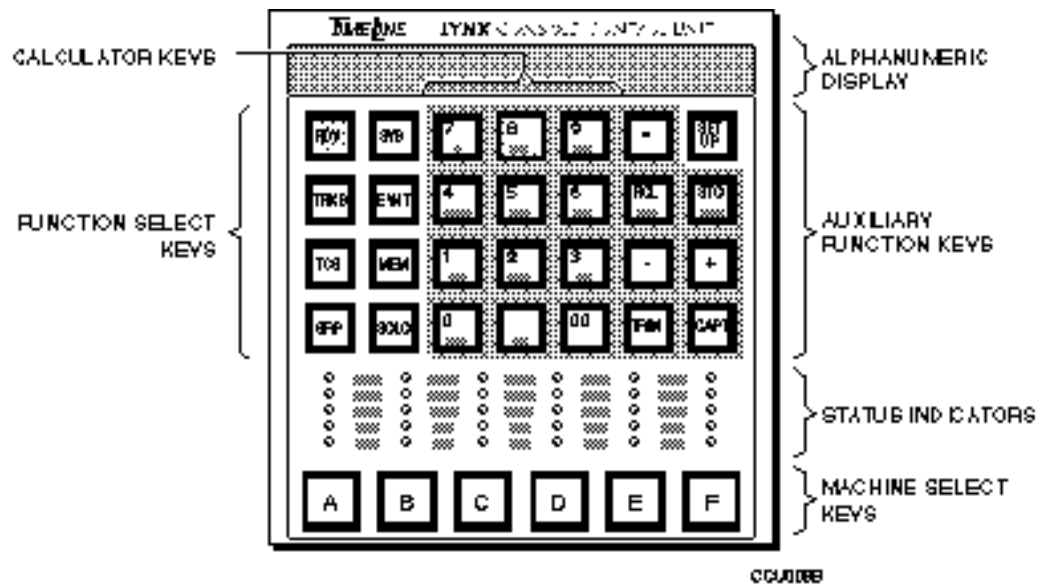
Figure 6-1. Front Panel

Introduction

This chapter identifies the six functional blocks for the Console Control Unit (CCU). These blocks are:

Display
Function Select
Calculator
Auxiliary Function Keys
Status Indicators
Machine Select

The function of each key and indicator is described in detail. Additionally, in the back of the chapter is a brief description of the motion control push buttons and optional jog wheel controls that are located on or in your console.

Display
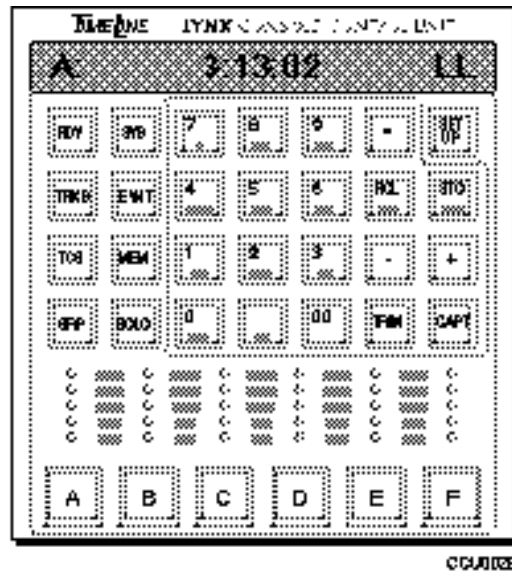
Figure 6-2. Display

The CCU uses a 16-character alphanumeric, dot-matrix display. Four categories of information are displayed:

1. Normal Operating Display
2. Calculator Display
3. Register Contents
4. Error Messages

Leading zeros are not displayed. For example, 3 minutes, 13 seconds, and 2 frames is written as:

00:03:13:02

The CCU displays it as:

3:13:02

Drop frame code is indicated by separating the minutes and seconds digits with a comma rather than a colon. For example, if the time code above is drop frame it would be written as:

3:13,02

Normal Operating Display

The normal CCU operating display is displayed when the CCU is initially turned on. For example;

A*   11:27:06:03 LL

A*   Indicates which machine is selected (A-F). Status information is displayed for that machine.

A capital letter (A) indicates that the machine selected is the master.

A lower case letter (a) indicates that the machine selected is a slave.

An asterisk (*) indicates that the machine is the reference.

Remember, *any machine (A-F) can be the master.*

11:27:06:03   Time code for machine A, the selected machine.

LL   Indicates whether the machine and group are in or out of lock. In this example, LL is used; however, any of the letters listed below may be used.

I   Internal Fix
i   Internal Variable
L   External Video
M   Mains
P   Pilot
T   External Time Code
V   VSO
A   Aux

The first letter indicates that the Master machine is locked to the reference. The second letter indicates that all other machines in the synchronized group are locked to the reference.

Calculator Display

When any of the calculator keys (00-9) are pressed, the normal operating display is replaced by the digit that was pressed. If you are performing an addition, the following example would represent a possible sequence. The example is calculated in 30 fps code.

You Press	You See	Description
1.	A 11:27:06:03 LL	Normal operating display
2. 55	55	You automatically enter the calculator display mode.
3. +	+	The CCU is ready for the next entry.
4. 21	21	The original number entered is replaced by the new entry
5. =	2:16	The answer is displayed. (NB 30 frame calculation)

Register Content

The calculator keys also provide access to register contents. Press **RCL** or **STO** in the Auxiliary Function Key section for access to these registers. When **RCL** or **STO** is selected, the respective key will flash. Select the required calculator register key to display the register value. For example, to examine the Inpoint, press **RCL** followed by **7 IN**. [IN] 11:27:06:03 will be displayed.

Error Display

When a system error occurs, the **SYS** key will flash. Refer to the Error Messages section in the Appendix for a complete list of error messages.

Press **SYS** to enter the "error mode". The **SYS** LED will turn on and the first error message will be displayed until you press **SYS** again. Pressing **SYS** again will display the next error message. After the last error is displayed, you will automatically exit the error mode. Pressing **CLR** will also exit the error mode.

The **SYS** LED will flash until all of the errors have been cleared. Clear the error register by pressing **CLR** + **SYS**, either in or out of error mode.

Function Select Keys
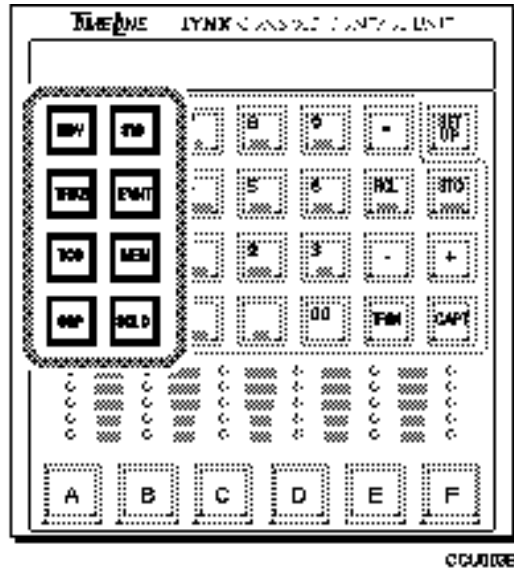
Figure 6-3. Function Select Keys

The CCU Function Select keys are used to determine system operating mode, set track and transport record enables, control events and other system activities.

REC   **REC** or the record key is a dual function key. It can be used in either record or tracks mode. When either function is enabled, the **REC** status LED will flash. If the Aux Status LED is set to Record Ready, it will turn on and the Record Status LED will not flash. See Setup and AUX LED for additional information.

REC is used in combination with the tape machine select key to record enable a tape machine. You press **REC** + Machine Select Key (A-F) to record enable a transport. The associated **REC** status LED will flash to indicate record ready status (Aux status - rec ready). Press **CLR** + **REC** to clear.

In **TRKS** mode, you may record enable a track (see **TRKS** description for details).

SYS   The **SYS** key flashes when a system error occurs. Refer to the Error Messages section in the Appendix for a complete list of error messages.

Press **SYS** to enter the "error mode". The **SYS** LED will turn on and the first error message will be displayed. Pressing **SYS** again will display the next error message. After the last error is displayed, the CCU automatically exits the error mode. Pressing **CLR** will also exit the error mode.

The **SYS** LED will flash until all of the errors have been cleared. Clear the error register by pressing **CLR** + **SYS** together.

TRKS   Use **TRKS**, the **Tracks** key to record enable different tracks on a tape or video machine. This feature *sometimes requires* the installation of the Serial Card option in the Lynx module. When one or more tracks are enabled, the **TRKS** light flashes and the **REC** key lights. To accommodate the numerous types of tape machines, the CCU has three 'pages' of setups that may be used individually or in combination.

Page	Display	Description
1	V 1 2 3 4 Syn TC V 1 2 3 4 Cue TC	Video or audio machine with less than 5 audio tracks
2	1 2 3 4 5 6 7 8	Multi-track up to 8 audio channels
3	"Track #01 :Safe"	Multi-track with more than 8 audio channels. Safe and Ready are assigned in the Set up menu, item 9.

Press **CLR** + **REC** to reset (or safe) all of the tracks. Immediately upon record enabling a track, the REC key will light.

Page 1 -
Video Machines   Select tracks to record enable from the calculator keyboard.

Key	Track	Key	Track
1	A1	0	V
2	A2	5	Syn/Cue
3	A3	6	Time code
4	A4	9	Assemble

Page 2 -
Audio Machines   Select tracks to record enable from the calculator keyboard.

Key	Track	Key	Track
1	A1	5	A5
2	A2	6	A6
3	A3	7	A7
4	A4	8	A8

**Page 3 -
Multitrack Machines**

Use the **LAST** and **NEXT** keys or the Jog wheel to scroll to the track that you would like to record enable (these keys will auto-repeat). Press **+** to enable or **-** to safe each track. If a track is safe, it may not be recorded on; the status will be displayed as

Track #**xx** :SAFE.

A track that is record enabled will be displayed as

Track #**xx** = Rdy.

Time Code + Multiple Audio Tracks

Procedure

You Press	You See	Description
1.		The serial interface card must be installed into the Lynx module
2. A	A flashing	Select the machine A-F that you would like to record enable specific tracks on.
3. TRKS	TRKS light on - - - - - - TC	The selected machine will blink or flash. You may change machine simply by pressing a different machine select key.
4. 6	REC light on	Press 6 to record enable the time code track.
5. A	Track #xx :Safe	Press the machine key to display page 3 of the track selection menu.
6. 1	Track 1 = Rdy	Track 1 can be enabled (if safe is displayed, the channel is locked and may not be recorded on. Go to the Set up menu, item 9 to change from safe to ready mode)
7. +	Track 1 = Rdy	Track 1 is enabled and will accept record operations.
8. NEXT	Track 2 = Safe	Track 2 is ready for selection.
9. 2	Track 2 = Rdy	Track 2 is enabled and will accept record operations. Repeat steps 7 - 9 for each track that you wish to enable. **NEXT** increments the track numbers and **LAST** decrements the track numbers.

EVNT   This function is not currently implemented.

MEM   The **MEM** or Memory Register key is used with the Calculator keypad. You can use **STO** to write numbers to a memory register or use **RCL** to read numbers from it.

Up to 100 memory registers are available in the CCU. The default is 0-9. Use the setup menu to select either 0-9 or 00-99 memory.

Remember, if you select up to 100 registers (00-99), you must always enter two digits to store or recall a number.

To recall a memory, press the **MEM** key. The **MEM** and **RCL** LEDs will flash followed by the memory number.

Procedure

You Press	You See	Description

Select the number of Memory Registers that will be available

1. SETUP		Enter Setup mode.
2. MEM	REg: 0-9	This is the default number of memory register available.
3. 1	REg: 00-99	Registers 00 through 99 may be selected by pressing 1.
4. SETUP	XX:XX:XX:XX	Press SETUP again to exit Setup mode.

Store a number to a Memory Register

5.	02:23:42:07	Assume this time code is displayed and you want to save it to a register to use it later.
6. STO MEM 09	STO flashes MEM flashes XX:XX:XX:XX	Store the number into a Memory Register. Enter the register number and if registers 00-99 are selected you must always use 2 digits to enter the register number.

Recall a number from a Memory Register

7. RCL MEM 09	RCL flashes MEM flashes CAPT flashes STO flashes 02:23:42:07	Recall or read a number from a particular Memory Register. If you only press the MEM key, the CCU assumes that you want to recall a value stored in the register number entered.

Capture a number and place it into a Memory Register

8.	02:23:42:07	Instead of storing a number, you may capture it.
9. CAPT MEM 09	02:23:42:07	CAPT captures the value. MEM stores it in Memory Register 09.

Park a transport at a captured time code location

10. SOLO + A MEM 09	A: XX:XX:XX:XX 02:23:42:07	Put one of the transports into solo mode. If you only press the MEM key, the CCU assumes that you want to recall a value stored in the register.
11. LOC (motion control keys) SCM: 02:23:42:07		Initiates a locate operation to the value stored in the selected memory.

GRP   Press **GRP** to operate selected tape machines as a synchronous group. When group is active, the **GRP** key and the selected machine keys (**A-F**) will be lit.

To assign a tape machine to a group:

> While holding down the GRP key, press the appropriate Machine Select key (A-F).

To remove a tape machine from a group:

> While holding down the GRP key, press the appropriate Machine Select key again.

STATUS   **GRP** is also used to access status mode. Status mode displays information that is specific to each machine in the group. In status mode, the group key is lit and the current Machine Select key flashes, indicating that status mode is active.

The status displayed is controlled by the Status Register setting entered through the **SETUP** key (refer to Auxiliary Function Keys). Machines designated as master are an exception. You will not see the time code, and the error will always be '0' when you press **SETUP**. To display the machine status, perform the following:

1. Press **GRP**.
2. Press the appropriate Machine Select key (**A-F**).
3. The status (time code, error, or both) will be displayed. Refer to SETUP to select the display.
4. To see the status of a different tape machine, simply press the appropriate Machine Select key.
5. Press the flashing Machine Select key again to return to normal group operating display.

SOLO   The Tape Machine is automatically assigned to a Machine Select key (**A-F**) by the CCU. The assignment is based on the address set up in the Lynx modules.

Press **SOLO** and the appropriate machine select key (**A-F**) to place the Tape Machine in solo.

The transport motion control buttons will only control the selected transport. All other transports will remain in their previous state.

Press the **SOLO** key twice to switch to **GRP** (group) mode.

Calculator Keys
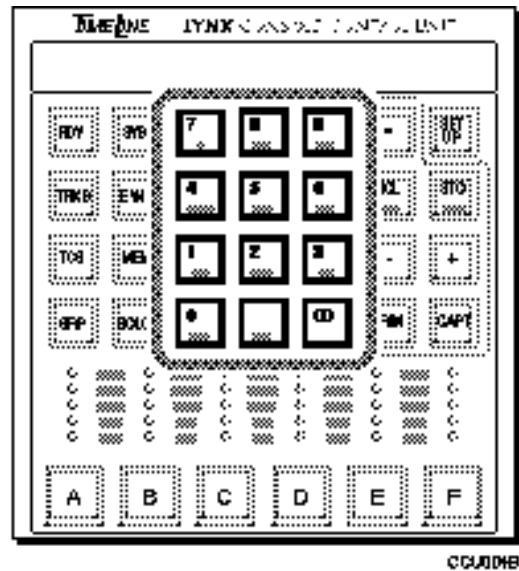
Figure 6-4. Calculator Keys

Most of the CCU Calculator keys perform dual functions. When you first press a numbered key, the calculator is active. Calculator numbers are entered left-to-right with the most significant digit first, leading zeros are ignored. Auxiliary function keys + , -,
and = are used with the calculator.

When you press one of the numbered keys, after one of four auxiliary function keys (**TRIM**, **CAPT**, **RCL**, or **STORE**), the alternate function of the numbered key becomes active.

00   This key is similar to the double '0' key on a calculator; it inserts two zeros into the display.

CLR   This is a multiple mode clear key. It clears the data entry area of the display window. Press **CLR** to perform the following:

1. Exit calculator mode and return to the normal operating display.
2. Clear incorrect entries for any key or function.
3. Clear the display buffer. If you have entered a number but have not yet stored it to a register, the original register value will be retained.
4. Clear registers. To clear a specific register, simultaneously press the **CLR** key and the calculator key for the register that you wish to clear.

For example, hold down the **CLR** key and press **OFST** to clear the offset register for a slave machine.

0 TIME

When not used as a '0' in calculator mode, press **RCL** or **STO**, then **TIME** to recall the current stored value or store a new value into the Time register. The current time code of the machine selected will be displayed. To display the current time code of a different machine, press the appropriate machine select key followed by **RCL** or **STO** then **TIME**.

1 PRE

When not used as a '1' in calculator mode, **PRE** provides access to the Preroll register. This register may be accessed during Store, Recall, or Trim operations. The value in the Preroll register is used to calculate the preroll position.

Preroll position = In Point - Preroll amount

The preroll position is the location that the CCU will cue the reference transport during Cue and Edit functions. The default value for preroll is five seconds.

2 POST

When not used as a '2' in calculator mode, **POST** provides access to the Post roll register. This register may be accessed during Store, Recall, or Trim operations. The value in the Postroll register is used by the CCU to calculate the time code of the end of an edit sequence, relative to the OutPoint. The default value for post roll is five seconds.

3 REF

When not used as a '3' in calculator mode, the **REF** register provides access to the Reference SyncPoint register. This register may be accessed during Store, Recall, or Trim Operations. Press **CLR** and **REF** simultaneously to clear the Reference SyncPoint register. The time code number in the Reference SyncPoint register is used by the CCU to automatically calculate offsets for any source transports with Source SyncPoints entered. The offsets are calculated as follows:

Offset = Source SyncPoint - Reference SyncPoint.

If you change the Reference SyncPoint number using Trim mode, or by entering a new Reference SyncPoint, the CCU automatically recalculates and stores the correct offset for all source transports with active Source SyncPoint Values.

4 SYNCP

When not used as a '4' in calculator mode, **SYNCP** provides access to the Source SyncPoint register for a specified transport. This register may be accessed in Store, Recall, and Trim operations. Each source transport in the system has a separate Offset register, which is accessed by selecting the transport using the Machine Select keys.

Press **CLR** and **SYNCP** simultaneously to clear a Source machine SyncPoint register.

The time code number in each transport's Source SyncPoint register is used, by the CCU, to automatically calculate an offset for a source machine relative to the reference transport. The offset is calculated as follows:

Offset = Source SyncPoint - Reference SyncPoint

The result of this calculation is displayed as a positive or negative number with an absolute value of 12:00:00:00 (12 hours) or less. If the Reference SyncPoint has a higher time code number than the Source SyncPoint, the keyboard displays the offset as a small negative number (for example: -1:10:00:00 rather than the equivalent large positive number, which would be 22:50:00:00).

If you change a Source SyncPoint number in the Trim mode, or enter a new Source SyncPoint value, the CCU automatically recalculates the offset for that transport.

5 OFST

When not used as a '5' in calculator mode, the **OFST** key provides access to the Offset register for the source transport currently selected in Solo or Status mode. This register may be accessed in Store, Recall, and Trim operations. Each source transport in the system has a separate Offset register, accessed by selecting the transport using the Machine Select keys. The reference transport cannot have an offset.

The Offset is a numerical expression of the relationship between the source and reference transport time code positions. It is always applied to the slave modules. Offset is determined as follows:

Slave/Source time code	-	Master/Reference time code	=	Offset
02:10:20:00	-	03:20:40:00	=	1 hr 10 min 20 sec offset

A positive offset indicates that the source machine time code numbers are higher than the reference time code numbers.

If the machine selected is the master tape machine, the offset register value will be zero, since offsets are always applied to slave machines.

Master Offset

Press **RCL** or **STO** to recall the currently stored value, or to store a new value into the Offset register. Each transport may have a different value stored.

There are three ways to calculate an offset: sync point, manually, or using capture and then offset.

Procedure

You Press	You See	Description
Sync Point		
1. SOLO		Solo the machine that must be offset from the master.
2. CLR + SYNCP		Clear the Sync Point register for the selected machine.
3.	02:23:42:07	A time code number for the selected machine is displayed.
4. SYNC	02:23:42:07	This time code is established as the sync point between the solo machine and the master.
5. STO OFST		The offset between the solo machine and the master is automatically calculated and stored in the Offset register.
Manually		
1. SOLO B	B* 01:03:02:07 LL	Solo a machine. Select any machine but the master.
2. 0 2 2 3 4 2 0 7	02:23:42:07	Use the Calculator keys to enter an offset.
3. STO OFST		Store the offset to the offset register.
Capture + Offset		
1. SOLO B	B* 02:23:42:07 LL	Solo a machine. Select any machine but the master.
2. CAPT		Capture the time code displayed.
3. OFSET		The offset is automatically calculated and stored by the CCU for the solo machine with respect to the master machine.
Clear the Offset Register		
1. CLR + OFST		Press simultaneously to clear the Offset register.

5 OFST (cont)

Subframe
You may adjust the offset by selecting **RCL**, **OFST**, and **TRIM**. Press the **+** and **-** keys to increase or decrease the offset. Although you can trim to subframes, the CCU will not display the subframe number.

Offset is correctly handled in either drop frame or non-drop frame time code, as well as mixed code situations. Offsets are always stored and displayed in the code format of the reference transport's time code, regardless of the type of code that each source machine has. For example, if the reference time code is drop frame, all offsets will be handled and displayed by the keyboard as drop frame; even if a particular offset refers to a machine with non-drop frame code.

Remember, drop frame code is displayed on the keyboard with the frames digits separated from the seconds digits by a comma, rather than a colon.

In mixed code situations, the actual offset value necessary to achieve the desired synchronization, the sum of three components:

1. The intuitive, "clock" difference between the two time code numbers.
2. A correction to this "clock" offset based on the difference in frame counts between the two time code formats.
3. A correction for the accumulated frame count difference since 00:00:00:00 (time code 'midnight').

   For example, if you want to synchronize 1:00:00:00 (non-drop frame) with 1:00:00,00 (drop frame), it actually requires an off-set of 3 seconds and 18 frames, to account for the difference in running frame count since 'midnight'.

   As shown in this example, the simplest solution is to let the CCU calculate the correct offset value.

6 ERR
When not used as a '6' in calculator mode, ERR provides access to the transport Error register. This register does not store any numbers, it provides a display of the positional error of any transport. This is the offset error of a transport, as reported to the CCU by the Lynx module.

Group Mode
When the CCU is in group mode, you can select Status and recall the ERR register. Press **RCL** + **ERR** to recall the current value of the Error register. The Error register contains the error between the master and slave tape position in frames (see the GRP key description under Function Select Keys for more information).

Solo Mode
There are occasions when the offset error has no meaning. The ERR register display has been programmed to show the most relevant information.

Display Mode	STOP	PLAY	Rewind/FWD
Solo	0.--	Resolve error in subframes	0.--
Group	0.--	Resolve error (ref machine)	0.--
Status slave	Distance from ref (park-ahead)	Resolve error (in subframes)	Distance from ref (Offset err)
Status master	0.--	Lock error (Offset error)	0.--

The CCU automatically displays subframe error when the error is less than one frame. When the displayed error is greater than one frame, the subframe component is suppressed and shows only as '.--'.

Subframes are only displayed if the error is less than one frame. For example, 0.25 would be displayed since it is less than one frame. However, if the error is between 17 and 18 frames, only '17.--' is displayed.

7 IN   When not used as a '7' in calculator mode, it provides access to the InPoint register. The InPoint register may be accessed in Store, Recall, and Trim operations. Press **CLR** and **IN** simultaneously, to clear the InPoint Register.

The number in the InPoint register is the Record InPoint of the currently programmed edit, in terms of the reference transport's time code.

Note

The InPoint is used to calculate source machine offsets if no Reference SyncPoint is entered.

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8 OUT   When not used as an '8' in calculator mode, **OUT** provides access to the OutPoint register. This register may be accessed during Store, Recall, or Trim operations. Press **CLR** and **OUT** simultaneously to clear the OutPoint Register.

The number stored in the OutPoint register is the Record Out point of the currently programmed edit in terms of the reference transport's time code. The Outpoint is automatically calculated and stored if you enter an InPoint and a Duration. Altering the value of the Duration will cause the OutPoint to automatically be recalculated and stored.

9 DUR   When not used as a '9' in calculator mode, **DUR** provides access to the Duration register. This register may be accessed in Store, Recall, and Trim operations. Whenever there are active values in the InPoint and OutPoint registers, there is an active number in the Duration register.

Press **CLR** and **DUR** simultaneously to clear the Duration register. Clearing it cancels the OutPoint Register.

The number in the Duration register is the length of the current programmed edit. This value is automatically calculated by the CCU from the InPoint and OutPoints.

$$Duration = OutPoint - Inpoint$$

If either the InPoint or OutPoint are changed, the duration is automatically recalculated. The correct OutPoint can also be calculated from an InPoint and Duration.

$$OutPoint = InPoint + Duration$$

For example,

1. Enter an InPoint by pressing the **IN** key at a desired point, or using the Calculator keys to specify an In Point.
2. Enter a Duration from the keypad using the **STO** and **DUR** keys.
3. You will see the **OUT** key light up indicating that the OutPoint register now contains an active value, which was calculated from the data that you just entered.

Auxiliary Function Keys
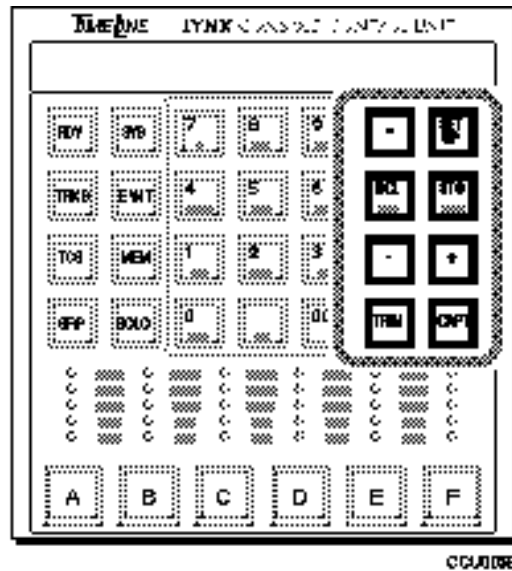
Figure 6-5. Auxiliary Function Keys

The Auxiliary Function Keys are used to perform arithmetic operations with the calculator keys and to setup CCU operations.

=   The equal key is used in conjunction with the + and – keys to perform time calculations. It indicates the completion of a calculation sequence and when pressed, the sum or difference will be displayed. The answer is reformatted into time code, if there is no other arithmetic operation in progress.

Procedure

You Press		You See	Description
1.	RCL TIME (0)	3:13:02	The time code stored in the Time Register.
2.	+	0	The CCU is ready for the next entry.
3. the	23	21	The original number entered is replaced by the
			new entry
4. begin	=	3:13:23	The answer is displayed in time code. Note that this represents 3 minutes, 13 seconds, and 23 frames. You must press CLR to
			a new calculation or return to the normal operating display.

SETUP   The **SETUP** key provides access to the user preference option
                     menus to customize CCU operation. To access individual menus,
                     press **SETUP**, then the appropriate menu selection. On the CCU,
                     you can select **SYS, GRP, TRKS, MEM** or **TRIM**. On the motion con-
                     trol key bank, you may select REC or ROLLBACK.

                     Once you have selected an operation to customize, select the
                     number from the calculator keypad corresponding to the feature.
                     For example, to adjust the display brightness you would select SYS
                     then '1' from the calculator keypad.

                     You may also press the **LAST** (**RCL**) or **Next** (**STO**), to move between
                     the menus. Press the **+** and **-** keys to move through the selections
                     in each submenu. Press **SETUP** again to exit this mode.

SETUP + SYS

0 Aux LED   Designate a function for the AUX LED CCU Status Indicators.

1 Brightness   Adjust the brightness of the CCU display.

2 CTRL via   Selecting direct means that all of the motion control switches are
                     enabled, selecting Neve disables Stop, Rewind, Fast Forward, and
                     Play.

3 Jog Speed   Adjust the sensitivity of the jog wheel; '1' is the fastest and 10 is
                     the slowest.

4 IntRef Fps   Set the system reference frame rate.

5 IntRef %   Adjust the internal reference to a value between 85 and 115. This
                     is like varispeed, in 100ths. Use the + and - keys to adjust.

6 Ref SRC   Select the system frame rate reference source.

7 Stat Reg   Select the registers that will be displayed in group status mode.
                     TC is for time code only, Err is for error only, and TC, Err will
                     make both available.

                             This is a real time status display and can be
                             called while the machines are in play.

SETUP + GRP

  0 Search   When in group, search will wait for all of the transports to search to the correct location then the tape machines will play. In chase mode the slaves will chase the master.

SETUP + TRKS

  0 Video Trk   Safe is the equivalent of write protect, you will not be able to write to the video track. Rdy (ready) indicates that you can record on the tape.

SETUP + TRIM

  0 Trim Frame   Trim between one and 10 frames. Use the + and – keys to change the trim number.

  1 Trim Subfr   One to 25 subframes may be trimmed. Use the + and – keys to change the trim number.

SETUP + MEM

  0   0-9   Selects memory registers 0-9

  1   00-00   Selects memory registers 00-99

RCL   **LAST**   This is a dual function key. Use it for recall mode or when you are in a mode to move backwards through the menu or register.

           Press **RCL** (recall) and one of the calculator keys to display the contents of the corresponding register. When you press the **RCL** key, it will flash and you will see a "recall reg" message in the display. Select the register by pressing the associated calculator key. Press RCL a second time while it is flashing, to cancel the command.

           There are separate Sync Point and Offset registers for each slave transport. The information displayed will be for the solo machine or the machine selected (**A-F**), by the **GRP** Status procedure (see **GRP** key description).

           When you are in SETUP mode, press **LAST** to move backwards through the menu.

You Press	You See	Description
1. RCL	RCL flashes	You would like to recall or display the time code in the InPoint register.
2 IN (IN)	3:13:02:23 RCL turns off	The time code is displayed and RCL automatically turns off.

| STO | NEXT | This is a dual function key. Use it to store a value to a register, or when you are in a mode, to move forward through the menu or register. |

The **STO** key is used with the numeric keypad to store numerical data into a selected register. Use this key to store a value to any of the registers:

Time
InPoint
OutPoint
Duration -   (also designate a transport by pressing a
                        Machine Select Key, **A-F**)
SyncPoint -   (also designate a transport by pressing a
                        Machine Select Key, **A-F**)
SyncPoint Offset -   (also designate a transport by pressing a
                        Machine Select Key, **A-F**)

Preroll
Post roll
Reference
Trim

You will not be able to store an offset or syncpoint value if the currently selected transport is the master. The following error message will be displayed: Solo a src first

Press a machine select key (**A-F**) and change the currently selected machine to one of the slave transports.

Remember, if you are in solo mode, the selected machine is the master by default.

Capt Key   The store function is automatically invoked when the **CAPT** key is used to capture a time code value (see **CAPT** key description).

You Press		You See	Description
1.	CALC Keys	3:13:02:23	Enter or recall a time code value.or RCL
2.	STO	STO flashes	You would like to store or save the time code to the InPoint register.
3.	IN (7)	3:13:02:23 STO turns off	The time code is stored into the InPoint register. Store automatically turns off.

- (minus)   The **-** or subtraction key is used with the **=** key, to subtract two time code values. It indicates that the next number entered will be subtracted from the first number entered. Subtraction is performed in terms of frames. Only one calculation at a time may be performed. After performing the calculation, it may be stored to a register. Press **CLR** to begin a new calculation or return to the normal operating display.

The minus key is also used with the **TRIM** key to bump or decrease the numerical value stored in a selected register, by the value of the TRIM register (see Trim).

If you subtract a large number from a smaller one, the result will be displayed in the correct negative time code number format.

You Press		You See	Description
1.	CALC keys or RCL	3:23:25	Enter the first number. Press RCL to select the contents of a register as the minuend.
2.	-	0	The subtraction operation is selected.
3.	RCL In (7)	RCL flashes 2:17:12	You subtract a value previously stored in a register (InPoint register in this example).
4.	=	3:10:45:11	The answer is displayed in time code.
5.			At this point you may decide to save this time code to another register.
6.	STO	STO flashes	The store function is active, select a register, for example Offset.
7.	OFST	STO turns off	The value is stored in the Offset Register.
8.	CLR	A 11:27:06:03 LL	The display returns to the normal operating display.

+ (plus)

The + or addition key is used with the = key to add two time code values together.

Addition is performed in terms of frames. Only one calculation at a time may be performed. The correct arithmetic is performed even if the numbers entered are incorrectly formatted. For example, if you enter 1:65:43, it will be translated to 2:06:13 (30-frame calculation) during the calculation.

The + (plus) key is also used with the TRIM key to bump or increase the numerical value stored in a selected register, by the value of the Trim register (see Trim).

You Press		You See	Description
1.	CALC keys or RCL	3:13:02:23	Enter the first number or press RCL and use the contents of a register.
2.	+	0	The addition operation is selected.
3.	RCL IN (7)	2:17:12	Add a value previously stored in a register (InPoint register in this example).
4.	=	3:13:20:05	The answer is displayed in time code (30 frame calculation).
5.			At this point you may decide to save this time code in another register.
6.	STO	STO flashes	The store function is active. Select a register (for example, Offset).
7.	OFST (5)	STO turns off	The sum is stored in the Offset register.
8.	CLR	A 11:27:06:03 LL	The display returns to the normal operating display.

TRIM   The **TRIM** key selects the Trim mode for the Jog Wheel and the **+** and **-** keys. You may adjust the values in most registers. After selecting trim, select a register, then press **+** or **-** to increase or decrease the register value by one. Holding **+** or **-** down will cause the value to increment or decrement multiple times. Press TRIM a second time to enter subframes, and a third time to store the trimmed value and exit the operation.

The next time that you select **TRIM**, the CCU selects the last register that you trimmed. Press a different register key in the Calculator keypad to change registers.

The following keys are active with **TRIM**:

CLR   Clears any number from the data entry area of the display and exits Trim mode.

STO   Initiates a Store command and prompts you in the display to designate a register

CAPT   The **CAPT** (capture) key captures the current time code number for manual storage in any of the CCU memory registers.

When you press the **CAPT** key the value of the time code shown in the display is instantly captured. The **CAPT** and **STO** (Store) keys flash when you press **CAPT**, until a register is selected to store the captured value in. If you do not want to store or save the value in a register, press **CAPT** a second time.

You Press	You See	Description
1.	03:13:02:23	You would like to store a time code in the InPoint register.
2. CAPT	CAPT flashes STO flashes	Both buttons flash. Display shows captured time code.
3. IN (7)		The time code is stored in the InPoint Register.
4 CAPT	STO turns off CAPT turns off	Pressing CAPT again cancels the store operation. The display returns to the reference time code.

Motion Control Keybank

REC   **1**   **Record key**   Record is initiated by Record (**Rec**) alone, or in combination with play (**Comb**).

ROLLBACK

      0   **Key Func**   Key functions as Rollback (**Rlback**) or Reverse Play (**RevPly**).

Table 6-1. CCU Setup Options

Key	Keypad #	Menu	Menu Selections		Valid Range
SYS	0	Aux LED:	RecRdy		
			Ofst		
			Mstr	(default)	
			M,Ofst	(master offset)	
	1	Brightness	15%		
			25%		
			50%	(default)	
			100%		
	2	Ctrl via:	Neve		(if jumper is
			Direct	(default)	installed)
	3	Jog Rate	5	(default)	1-10
	4	Stat Reg:	TC		
			Err	(default)	
			TC,Err		
	5	Trim Frame	1		1-10
	6	Trim Subfr	1		1-25
TCG Key	0	Sys Ref	IntFix	(read from SSU)	
			IntVar		
			ExtVid		
			Mains		
			Pilot		
			ExtTC		
			VSO		
			AUX		
	1	Spd/Code	24/24		
			25/25		
			29/DF		
			29/30		
			30/DF		
			30/30		
	2	Varispd %	100.00	(default)	85.00-115.00
GRP	0	Search:	Chase	(default)	
			Group		
TRKS	0	Video Trks	Safe	(default)	
			Rdy		
	1	Video rst:	Off		
			On		
MEM	0	Mem Size:	0-9	(default)	
			00-99		

Table 6-2. Motion Key Setup Options

REC	2	Rec Key:	P+Rec (default) Rec	
ROLL-BACK	0	Rollback:	Rlback (default) RevPly	
REH	1	Reh key:	P+Reh Reh	
Evnt	0	Mode:	Normal Auto Rec Ex Rec Reh El Reh Lock	
	1	Beep Mode:	Off On	
	2	Spacing:		10-30
	3	Last beep:	Muted On	
Tran (A-F)	0	Capstan:	Wild Reslvd	
Loop	0	> Edit:	Stop Reedit Replay	
	1	> Replay:	End Repeat	
	2	> End:	Stop Rcv	
Edit	0	Edit Q/C	Off Normal	
	1	Rolls as:	Mst Slv All Slv	
	2	Edit Dspl:	Normal Cntdn	
Rdy	0	Rdy Lamp	Off Steady Flash	
TCG	3	TCG Mode:	P, Run P, Mute P, Wild	
	4	VITC Mode:	Off On	

Status Indicators

Figure 6-6. Status Indicator

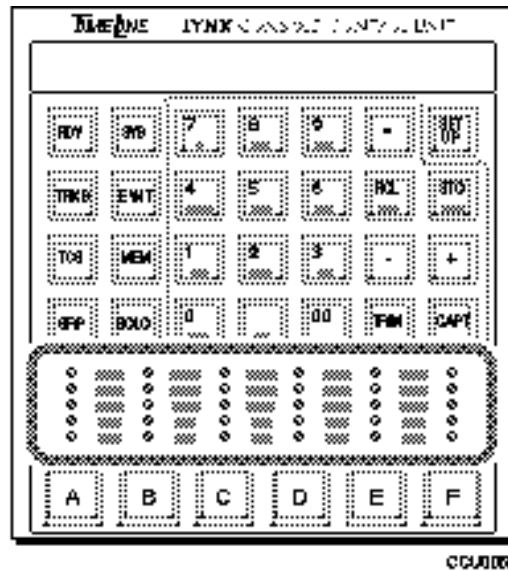|	
LOCK	When lit, the corresponding machine is locked to the system reference.
CODE	When lit, code is present and the corresponding machine is in play. If it is flashing, the corresponding machine is playing, but no time code is present. If it is off, there is no time code and the corresponding machine is not moving.
BUSY	When lit, the corresponding transport is in motion but not locked. Generally, one of the following operations is in progress:

> start of play
>
> rewind
>
> fast forward
>
> shuttle/jog

|	
REC	If selected as the **AUX** LED function and **AUX** is lit, the machine is recording. When flashing, the machine is ready to record.
AUX	This LED is user assignable in the **SETUP** SYS process. (For additional information, refer to the **SETUP** description in this chapter.) You may assign it as Record Ready, Offset present, Master machine or Master offset. If just a master is selected and there are no offsets only the master light will be lit. If a master and slave(s) are selected with an offset, then the master and the machines with the offset will be lit.

Machine Select Keys
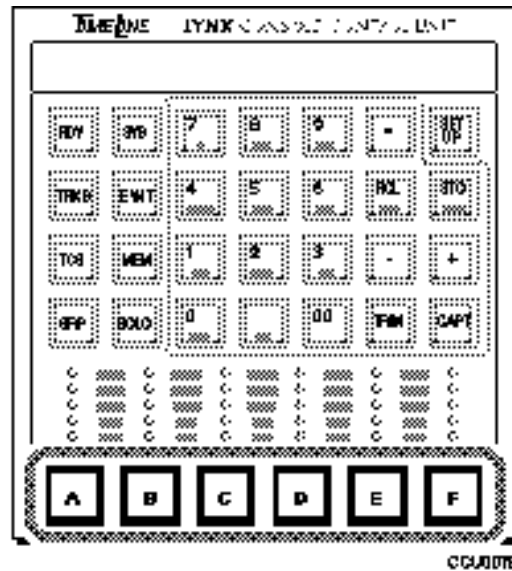
Figure 6-7. Machine Select Keys

A - F You may assign up to six Lynx modules and associated transports to the Machine Select Keys (**A-F**). They will be controlled from the CCU through the System Supervisor (SSU). These machines may be operated individually in Solo mode, or synchronously in Group mode.

Solo Mode Press **SOLO** and the appropriate machine select key (**A-F**). The transport control pushbuttons will control only the selected machine. All other transports will remain in the current state of motion. To select a different transport, press the appropriate machine select key (**A-F**).

Group Mode All machines assigned to the group will be controlled together by the transport control pushbuttons (synchronously in play).

To assign a machine to a group, press and hold the **GRP** key and the appropriate Machine Select key (**A-F**). To remove a machine from a group, press and hold the **GRP** key and the appropriate Machine Select Key (**A-F**).

Motion Control Pushbuttons

Motion Control Pushbuttons may optionally be connected to the CCU. The motion control cable is attached to J6 on the CCU Processor Board. Please refer to Chapter 3, Installation under Motion Control Interface for installation and connection instructions.
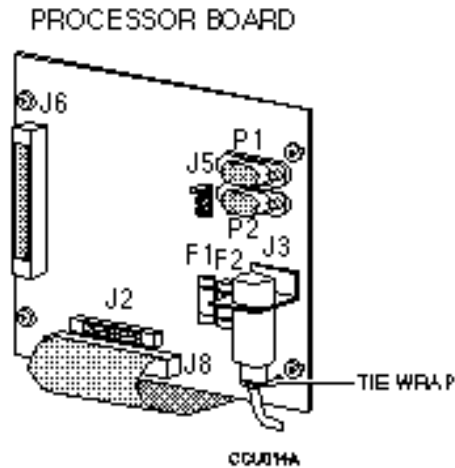

Figure 6-8. Motion Control Pushbutton Connector

<< (Rewind) In solo mode, the rewind command is issued only to the transport that is soloed. In group mode, the rewind command puts all transports currently assigned to the group into rewind or chase.

>> (Fast Forward) In solo mode, the fast forward command is issued only to the transport that is soloed. In group mode, the fast forward command puts all transports currently assigned to the group into fast forward or chase.

• (Stop) In solo mode, the stop command is issued only to the transport that is soloed. Pressing stop in group mode initiates an intelligent stop function. The reference or master transport stops immediately, and then parks each source machine at a position that corresponds to the reference or master machine's parked position, taking individual offsets into account. Thus cueing the system to be ready to synchronize.

> (Play)   In solo mode, the play command is issued only to the transport that is soloed. In group mode, all of the transports in the group are synchronized.

When the reference or master machine is up to speed and resolved, a letter will appear after the time code in the display. The master machine is identified on the Lynx display by a capital letter and an asterisk; for example **A***. Slave machines are indicated on the CCU display with a lower case letter. The letter also indicates the specific reference being used.

I   Internal Fix
i   Internal Variable
L   External Video
M   Mains
P   Pilot
T   External Time Code
V   VSO
A   Auxiliary

As each transport achieves lock with the reference or master transport, a second letter will be displayed.

A sample sequence might look as follows:

A* 1:16:37:01   The master is selected.

A* 1:16:40:04 I   The master is resolved and locked to the internal variable reference source.

A* 1:16:42:06 II   All machines are resolved and locked.

Rec   Pressing **REC** or record issues the record command to any active, record-enabled transport. Look at the status indicators to determine which tape machines are selected.

If the CCU is in either Solo or Group mode, press the **REC** key while holding the Play (>) key on the Console Motion Switches, to issue an immediate Record In command (punch-in) to all active machines, that are in lock or resolve status.

Pressing any transport motion key while in Record mode cancels the Record mode; a rolling punch-out can be performed by pressing the Play (>) key while in Record.

In Solo mode, a Record In command will only be issued to a transport, it if is record enabled and running at resolved speed.

In Group mode, Record In commands are only issued to transports that are assigned to the group, record enabled, and have achieved lock. Verify this status by looking at the right of the time code display, two letters should be visible.

It is possible to put the master machine into Record as soon as it has achieved resolved speed, even if none of the source transports have locked to it. It is not possible to send a Record In command to any source machine, until it has achieved lock with the reference.

If not all of the machines in the group have locked, the CCU will not go into record mode.

Jog/Shuttle Wheel

The CCU supports transport control with a Jog/Shuttle Wheel. The optional Jog/Shuttle Wheel runs forward or backward, or winds at shuttle speeds. The Jog/Shuttle Wheel has three modes: Trim, Jog, and Shuttle. The Jog/Shuttle Wheel cable should be attached to J2 on the CCU Processor Board. Hardware and cabling installation instructions for the Jog/Shuttle option are described in Chapter 3, Installation.
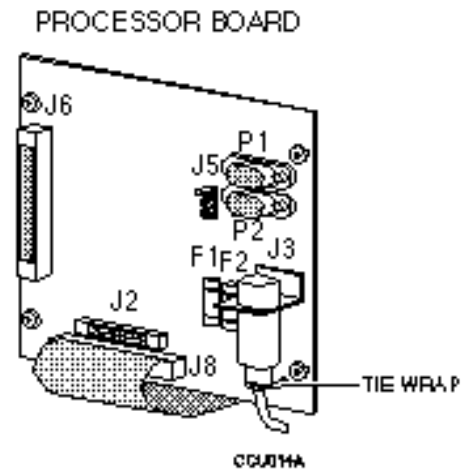
Figure 6-9. Optional Jog Wheel Connection

Trim   In the trim mode, the wheel is used to adjust the value stored in any of the the CCU's edit or offset registers. For example, you may trim the offset of a source transport in real time to achieve a precise time relationship betweeen the source transport and the reference. Refer to the description of the **TRIM** key in the Auxiliary Function Keys section for complete operating information. In this mode, the Jog Wheel is used instead of the **+** and **-** keys to increment or decrement a value.

Jog   In the jog mode, the wheel is used to "bump" a transport forward (clockwise) or backward (counter-clockwise) a small amount each time that it is turned. If you turn the wheel continuously, the tape will "scrub" past the heads with a velocity proportional to how fast you turn the wheel.

Shuttle   In the Shuttle mode, turning the wheel clockwise causes the active transport(s) to move forward with a velocity proportional to the amount that you rotate the wheel from its starting position. Likewise, turning the wheel counter-clockwise initiates variable-speed backwards motion. The Shuttle speed may be varied from a slow crawl, to several times normal play speed.

Generally speaking, the Shuttle mode is a controlled speed mode only on video transports. Most audio tape transports do not have a variable speed shuttle mode, so the shuttle function is implemented by rapidly toggling between rewind and fast forward. The actual velocity is determined by the ballistics of the particular transport, and the relative tape pack on the reels.

Shuttle is most effectively used in the Solo mode to accurately position a single transport for setting SyncPoints or InPoints and OutPoints. If you use the Shuttle function in Group mode, the wheel controls only the reference transport; all other machines will chase the reference machine and attempt to maintain their correct park-ahead offset.

Appendix

Error Messages

Introduction

The CCU provides several levels of user information: system error messages, prompts, messages and warnings.

System error messages are displayed when the CCU is unable to perform, due to a system failure or communications discontinuity.

Prompts are displayed as a reminder, when a specific keyboard entry sequence is required.

Messages are displayed if a command sequence is entered incorrectly.

Warnings are displayed when an illegal combination of commands is entered, access is attempted to a device that doesn't exist, or a condition exists that the operator may need to be aware of.

System Error Messages

System error messages are not automatically displayed. When an error occurs, normal operation can continue, provided that communication between each piece of equipment hasn't been completely dropped. The **SYS** key will flash to indicate that a system error has occurred.

The CCU can generate and save multiple error messages. Each time an error condition occurs, such as losing communications between the CCU and SSU, an error message will be added to the stack. The error message stack is a list of errors created by the CCU program, which can be read at any time.

Procedure

Press	You See	Description
1.	**SYS** light flashing	When the **SYS** light flashes, a system error has occurred.
2. **SYS**	Comm error: SSU	The first error message in the error stack or list is displayed. Correct the problem.
3. **CLR**	Normal display	Occasionally after clearing the error message, another message will be displayed. This occurs because the CCU holds error messages in a stack; when the top message is removed, the next one is displayed. Repeat step 2 until all messages have been read.
4. **CLR + SYS**	Display clears	You have erased the error messages.

System Error Messages

ACG in lost lock

Cause: The ACG Option card has not locked to the incoming AES/EBU, Word or Oversample Clock: because the signal is either not present or out of range.

Solution: Verify that the external digital audio clock is present and connected to the correct input. Check that the ACG setup parameters have been correctly configured.

ACG out lost lock

Cause: The ACG Option card has not locked to the system reference.

Solution: Verify that the selected system reference is present. Check that the Keyboard Ref Lock LED is on.

Comm Error

Cause: The connection between the System Unit (SSU) and the Keyboard Controller (KBD) has been dropped, either momentarily or completely. Each time there is a communication error, this message will be added to the stack.

Solution: Check the SSU to KBD cable connection, reset either the SSU or the KBD.

Ref Not Present

Cause: A reference source that is not present has been selected.

Solution: Verify that the reference source is connected, or that the correct reference source has been selected.

Ref Src Changed

Cause: The reference source has been changed at some point during operations. This may have occurred inadvertently.

Solution: Verify that the correct reference source is selected, by checking TCG Option menu in Setup mode.

System Err: XXXX

Cause: An internal communications inconsistency has occurred. The error type XXXX is a Hex number that will assist the factory in locating the problem. System error codes are specific to different parts of the system. The first two characters define where the error was produced. The second two characters are the type of error.

for example:	88XX is	ACG card	A6	D
	A0XX is	machine A	A8	E
	A2XX is	machine B	AA	F
	A4XX is	machine C	AC	TCG

Solution: Note the system error number, and contact the factory for further information.

Sys Fps Changed

Cause: The system frame rate has been changed at some point during operations. This has probably been caused by a change in the reference machine time code type.

Solution: Verify that the correct time code is present on the tapes. Check that the correct frame rate and code type are selected, by checking TCG Option menu in Setup mode.

X Ampex Chksum

Cause: A serial communications error has occurred with the specified Ampex transport.

X Serial NAK

Cause: The specified serially-controlled transport has responded with a negative acknowledge (NAK) to a command.

Solution: Verify that the correct transport type has been selected in the Tran Setup menu.

X Sony Chksum

Cause: A serial communications error has occurred with the specified Sony transport.

Self Test Messages

The CCU has a Self Test procedure that is invoked by pressing GRP + SYS, then confirming the key selection. The following messages and information are displayed during the self test process.

Running Self Test

Cause: The keyboard self test procedure has been initiated.

Checking RAM: 8K

Cause: The keyboard RAM is being checked.

Checking ROM: 64K

Cause: The keyboard ROM is being checked.

Cheksum: _____

Cause: The keyboard PROM is read and the checksum displayed. Press any key to continue self test.

Verify Lights

Cause: All keyboard LED's are lit for verification. Press any key to continue self test.

No keys pressed

Cause: The keyboard key test routine is entered. Press keys to confirm that they are being correctly scanned, the associated LED will also be tested. Press SETUP + CLR to exit the key test routine.

Dspl OK
Dspl Err

When Self Test is complete, the CCU will cold boot and return to normal operation.

Error Messages

Can't do this

Cause: You can't capture to the pre, post, or duration register.

Solution: Repeat the capture sequence and select a different register or memory.

Must be slave

Cause: An operation has been selected that is only relevant to a slave transport. There are several operations that can only be performed on slave machines, not the reference or master machine. For example, setting an offset or a source sync point is done on a slave machine.

Solution: Select a slave machine.

X Capstan Error

Cause: The capstan of the specified transport is not responding to synchronization control.

Solution: Make sure that the transport is set for external control.

X No Serial Comm

Cause: The specified transport is not responding to serial control.

Solution: Make sure that the cable is properly connected to the transport. Check that the correct transport type has been selected in the transport setup menu.

X Speed 30 ips

Cause: The specified transport should be switched to the indicated play speed, for the time code to play at the correct rate.

X Speed 15 ips

Cause: The specified transport should be switched to the indicated play speed, for the time code to play at the correct rate.

X Speed 7.5 ips

Cause: The specified transport should be switched to the indicated play speed, for the time code to play at the correct rate.

X Tape Out

Cause: The specified transport is not responding to a motion command. The most common cause of this message is that the tape has spooled off the machine.

Solution: Check that there is a tape threaded on the machine.

X Tran in Local

Cause: The specified serially controlled transport is switched to local.

Solution: Check that the Remote switch is set to remote at the machine.

Warnings

No lock, abort

> *Cause*: All machines within a group have not locked before the In Point, in an Edit sequence. The system will retry the Edit unless Edit Q/C has been set to Stop, in the Edit Options menu.

> *Solution*: Establish which transport is not locking, and rectify the problem. Lengthen the preroll, or if it is the master machine, try operating in Group or Master/Slave mode.

No lock, Q/C off

> *Cause*: All machines within a group have not locked before the In Point, in an Edit sequence. The system will continue to roll the edit since Edit Q/C has been disabled in the Edit Options menu.

> *Solution*: Establish which transport is not locking, and rectify the problem.

Cue pt

> *Cause*: An Edit command has been issued and the Cue Point is after the In Point, minus the system preroll.

> *Solution*: Clear or set a new Cue Point.

Edit ended early

> *Cause*: An Edit sequence ended before the machines had reached the Out Point. This normally is the result of pressing stop or play.

**CCU - CLR to clear mem
KCU/KBD ???**

> *Cause*: The Keyboard Controller has been reset by pressing CLR + SETUP and confirmed. If you press CLR, the memory and register contents will be reset to the factory defaults. If not, the current register and memory values will be retained.

Clearing memory

> *Cause*: A keyboard cold boot operation is in process. The keyboard will re-initialize to default parameters. Some information will be cleared.

Holding memory

Cause: A keyboard warm boot operation is in process. The keyboard variables will re-initialize. No information is cleared.

No In or Cue set

Cause: A CUE command to locate the transports to the Cue Point has been issued, and no Cue or In Point is set.

Solution: Set a Cue or In Point by using the F3 or F1 keys. Time code values can also be entered and stored to these registers by using STO and CUE or STO and IN.

Not Available

Cause: A transport or device has been selected that is not available.

Solution: Select a different transport.

Old off set used

Cause: When trimming an offset, the trim process was exited by pressing CLR.

Solution: This message informs you that the new offset was not saved and the old offset will be used; the offset wasn't changed or adjusted by the aborted trim operation.

"Out" before "in"

Cause: An Edit command has been issued when the Out Point is before the In Point.

Solution: Set a new Out Point after the In Point.

SSU Clearing Now

Cause: A CLR + SYS command has been entered and confirmed. The SSU will reset to default parameters, and all setup information will be lost.

Enter locate pt

Cause: No replay point set.

Safe or Invalid

Cause: A track record enables command has been ignored because the track has been set to safe, or the system cannot enable it.

Solution: Use the setup menu to select and set the track to ready, then set the track to enable.

WARNING None Rdy

Cause: No transports have been record readied in Edit; therefore, the CCU will not issue the Record or Rehearse commands.

Solution: Set one or more transports to record ready, by using the RDY and machine select keys.

X does not exist - X = (A-C)

Cause: You have tried to solo or group a machine that is unavailable.

Solution: Verify that the machine setup is correct.

Prompts

MSTR: GRP + (A-F)

Cause: The CCU requires that machines are selected to a group for synchronization. If no machines are selected to the group, this prompt is displayed. The GRP LED and the available machine select keys (A-C, TCG) will flash.

Solution: Hold the GRP key and press machine select keys (A-C, TCG) to make a group. Remember, the machine key selected first will be the reference machine.

CAPT to continue

Cause: A data loss function has been selected. The CCU prompts for a confirmation before performing the command. When this prompt is used, the command will involve resetting the system.

Solution: Press ENTR if you wish to proceed, or any other key to exit.

Recall mem

Cause: MEM has been pressed and the CCU is prompting for a memory selection.

Solution: Select memory number.

Rcl reg or mem

Cause: Recall (RCL) has been pressed and the CCU is prompting for a register or memory selection.

Solution: Select a valid register or press MEM followed by the memory number.

Select valid reg

Cause: Trim mode has been selected and an invalid register, or no register, is present in the calculator data entry buffer.

Solution: Use RCL to select the register you want to trim or CLR to cancel.

Set an "in" pt

> *Cause*: Edit mode has been entered and no edit In Point has been set.

> *Solution*: Capture or enter a time code value and store in the In Point register.

CCU - Solo a grp first
KCU/KBD - "Solo a group first"

> *Cause*: You have attempted to recall or store a sync position or offset register while in group mode.

> *Solution*: These operations may only be performed in solo or group status mode. Select solo or status modes and repeat the operation.

Solo the ref

> *Cause*: A reference sync point cannot be captured in group mode or if a slave machine is selected in solo mode.

> *Solution*: Solo the reference machine.

Sto reg or mem

> *Cause*: The CAPT or STO keys have been pressed. CCU is prompting for a valid register or memory number.

> *Solution*: Select a valid register or press MEM followed by the memory number.

KBD

> Press GRP + SETUP to establish communications.

KCU

> Press POLL to establish communications

CCU

> POLL: GRP + SETUP

SSU to Neve Computer Time Code Cable

The cable between the SSU Audio I/O connecter and the SMPTE port on the Neve computer is customer supplied. Use the following pin out and illustration to make a cable.
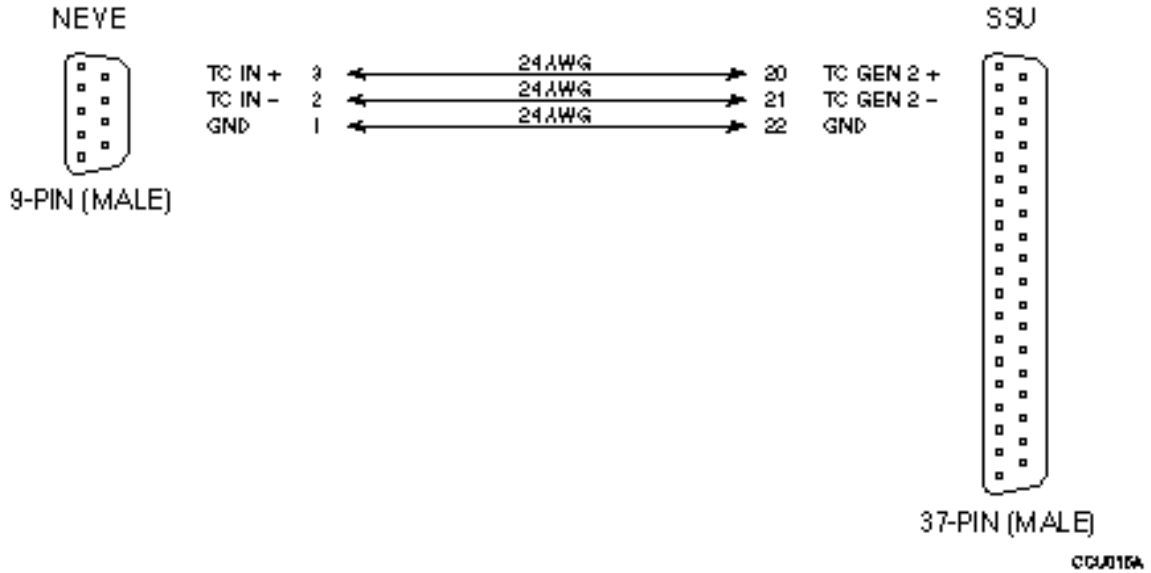

Figure 1. SSU to Neve Computer Cable

Table 1. SSU 37-pin Connector Pin Descriptions

Pin	Signal	Pin	Signal
1	TC Generator 1 Out, +	20	TC Generator 2 Out, +
2	TC Generator 1, Out, -	21	TC Generator 2 Out, -
3	Ground	22	Ground
4	TC Generator 3, Out, +	23	Pilot Out, +
5	TC Generator 3, Out, -	24	Pilot Out, -
6	Ground	25	Ground
7	ADR Beep Out, +	26	Spare
8	ADR Beep Out, -	27	Spare
9	Ground	28	Spare
10	Audio Trigger In, +	29	Pilot In, +
11	Audio Trigger In, -	30	Pilot In, -
12	Ground	31	Ground
13	Spare	32	Reference Pilot Out, +
14	Reshaped Ref Time code Out, +	33	Reference Pilot Out, -
15	Reshaped Ref Time code Out, -	34	Ground
16	Ground	35	Spare
17	Reference Time code In, +	36	Spare
18	Reference Time code In, -	37	Spare
19	Ground	37	