OTARI®

RADAR II
RANDOM ACCESS DIGITAL AUDIO RECORDER

OPERATION MANUAL

P A R T I A L D R A F T

Otari Manufacturing Corporation

CAUTION

To prevent fire or shock hazard:

Do not expose this unit to rain or moisture.

Do not remove panels (unless instructed to do so).

There are no user-serviceable parts inside.

Refer servicing to qualified service personnel.

PLEASE READ THROUGH THE SAFETY INSTRUCTIONS ON THE NEXT PAGE.

SAFETY INSTRUCTIONS

1.	**Read Instructions**	All safety and operating instructions should be read before operation.
2.	**Retain Instructions**	The safety and operating instructions should be retained for future reference.
3.	**Heed Warnings**	All warnings on the device and in the operating instructions should be complied with.
4.	**Follow Instructions**	All operating and use instructions should be followed.
5.	**Water and Moisture**	The device should not be used near water — for example, near a bathtub, wash bowl, sink, laundry tub, in a wet basement, near a swimming pool, etc.
6.	**Carts and Stands**	The device should be used only with a cart or stand that is recommended by the manufacturer.
7.	**Ventilation**	The device should be situated so that its location or position does not interfere with its proper ventilation. For example, the device should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
8.	**Heat**	The device should be situated away from heat sources such as a radiator, heat register, stove or other appliances (including amplifiers) that produce heat.
9.	**Power Sources**	The device should be connected to a power supply only of the type described in the operating instructions or as marked on the device.
10.	**Grounding or Polarization**	Precautions should be taken so that the grounding or polarization means of the device is not defeated.
11.	**Power Cord Protection**	Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the device.
12.	**Cleaning**	The device should be cleaned only as recommended by the manufacturer.
13.	**Non-Use Periods**	The power cord of the device should be unplugged from the outlet when left unused for a long period of time.
14	**Object and Liquid Entry**	Care should be taken that objects do not enter and that liquids are not spilled into the enclosure through openings.
15.	**Damage Requiring Service**	The device should be serviced by qualified service personnel when:

A. The power supply cord or the plug has been damaged; or
B. Objects have entered, or liquid has been spilled into the appliance; or
C. The appliance has been exposed to rain; or
D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
E. The appliance has been dropped, or the enclosure damaged.

16.	**Servicing**	The user should not attempt to service the device beyond what is described in the operating instructions. All other service should be referred to qualified personnel.

COMMUNICATION WITH OTARI

FOR SERVICE INFORMATION AND PARTS

All Otari products are manufactured under strict quality control. Each unit is carefully inspected and tested prior to shipment.

If, however, some adjustment or technical support becomes necessary, replacement parts are required, or technical questions arise, please contact your Otari dealer or contact Otari at:

Otari, Inc.

    4-33-3 Kokuryocho, Chofu-shi,

    182, Tokyo, Japan

        Telephone : 0424-81-8626

        Fax   : 0424-81-8633

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        Telephone : (415) 341-5900

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    Rudolf-Diesel-Str.12

    D-40670 Meerbusch (Osterath)

    F.R. Germany

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    Singapore 1336

        Telephone : (65) 284-7211

        Fax   : (65) 284-4727

        Telex   : RS 36935 OTARI

Another part of Otari's continuing technical support program for our products is the continuous revision of manuals as the equipment is improved or modified. In order for you to receive the information and support which is applicable to your equipment, and for the technical support program to function properly, please include the following information, most of which can be obtained from the Serial number label on the machine, in all correspondence with Otari:

- Model Number:
- Serial Number:
- Date of Purchase:
- Name and address of the dealer where the machine was purchased and the power requirements (voltage and frequency) of the machine.

CERTIFICATIONS

FCC STATEMENT

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

•   Re-orient or relocate the receiving antenna

•   Increase the separation between the equipment and the receiver

•   Connect the equipment into an outlet on a circuit different from that which the receiver is connected

•   Consult the dealer or an experienced radio/TV technician for help

Shielded cables and I/O cords must be used with this equipment to comply with the relevant FCC regulations.

Changes or modifications not expressly approved in writing by Otari Manufacturing

CANADIAN STANDARDS ASSOCIATION
ASSOCIATION CANADIENNE DE NORMALISATION

C This product has been found to comply with all applicable CSA standards

UNDERWRITER'S LABORATORIES

This product has been found to comply with all applicable UL standards

LIMITED WARRANTY

The RADAR system and RE-8 session controller are warranted from the date of purchase to the original purchaser to be free from defects in material or workmanship for a period of one (1) year.

The hard disk drives contained within the RADAR chassis are warranted for a period of five (5) years.

This warranty does not apply to damage resulting from improper or negligent use, inadequate or improper packaging for shipment, damage incurred during shipment, or unauthorized modification.

The sole and exclusive remedy for breach of any warranty concerning the RADAR system, RE-8 session controller, and supplied internal hard disk drives shall be repair or replacement of defective parts at the discretion of Otari Corporation.

Repair or replacement of RADAR and/or RE-8 components will be performed at no charge for parts or labor for one (1) year from date of purchase to the original purchaser at a designated Otari service center or the factory, at Otari's discretion. Repair or replacement of the hard disk drives contained within the RADAR system will be performed at no charge for parts or labor for five (5) years from the date of purchase to the original purchaser at a designated Otari service center or the factory, at Otari's discretion.

Otari Corporation disclaims any warranty, expressed or implied of suitability for specific use and disclaims any liability for incidental, special, or consequential damages.

Please Read This First...

Congratulations on the purchase of your new RADAR system!

In order for Otari to maintain contact with you regarding new system features for your RADAR machine and to provide you with the best service possible, we ask that you take a moment to fill out the form below and return it to us as soon as possible. Our address is:

Otari Corporation
378 Vintage Park Drive
Foster City, CA 94404
Attn: RADAR Service Department

RADAR User Information

Company: _____

Contact: _____

Address: _____

City: _____   **State & ZIP:**   _____

Phone: _____   **Fax:**   _____

Dealer: _____

Purchase Date: _____

RADAR S/N: _____

RE-8 S/N: _____

EXB-5G S/N: _____

EDB-3 S/N: _____

Type of Business
(Please check all that apply)

___Music Recording   ___TV Production   ___Film Production

___Broadcasting   ___Other *(describe)* _____

                            _____

                            _____

                            _____

DEAR RADAR CUSTOMER:

TO ALLOW US TO SERVE YOU WITH THE BEST CUSTOMER SUPPORT POSSIBLE, PLEASE TAKE THE TIME TO FILL OUT AND RETURN THE USER INFORMATION FORM ON THE REVERSE SIDE OF THIS PAGE.

THANK YOU !

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Corporation may void the user's authority to operate this equipment.

Section 1   Welcome to RADAR II

Welcome to RADAR II!!! Each section of this manual begins with its own table of contents to help you find information fast. In addition, there is a quick index at the end of the manual.

This section includes the following subsections.

1.1 INTRODUCTION

Congratulations on your purchase of the Otari RADAR II random-access digital audio recorder. RADAR II has been designed to provide you with a fast, reliable, and feature-rich environment with which to record and edit audio material. All of us at Otari hope that you enjoy your system and that RADAR II becomes an integral part of your day to day audio production needs.

1.2 RADAR II SYSTEM FEATURES

Familiar Transport Controls

RADAR II's familiar transport and track arming controls make it easy to become productive almost immediately; you get the advantages of advanced technology without needing to become a proficient computer user.

24 Discrete Audio Inputs and Outputs

RADAR II acts just like a standard 24 track tape machine. Each track has its own balanced input and output. You can record on all 24 tracks at the same time to capture a live performance by a band or orchestra and then assign a separate external processor for compression or effects during mixdown.

Self-Contained System

RADAR II is a fully integrated system. There are no compatibility, setup or interface problems arising from having to connect a computer with another manufacturer's audio card or external black boxes. This also makes RADAR II much easier to learn for people who are not familiar with computers.

Highest Quality Digital Audio Features 24-Bit Data Pathways

The most important parts of a digital recorder are the converters that produce digital data from a microphone preamp or line mixer. RADAR II's 20 bit digital converters use the latest technology for the purest sound possible.

RADAR II is capable of recording a project either in 16-bit or 24 bit format!

Compatibility with Earlier Systems

RADAR II files and projects are compatible with earlier RADAR versions - however 24 bit projects can't be restored onto earlier hardware.

Flexible Sync Capabilities

We have placed great emphasis on developing reliable external synchronization for RADAR II. On RADAR II, external sync is not an expensive option package, but is included in every system. And, RADAR II's sync functions are flexible enough to tolerate variable speeds from the time code source.

RADAR II's transport speed control can continuously synchronize to wild SMPTE Time Code. A highly specialized clock circuit can effortlessly track a varying SMPTE signal from a tape machine even if Varispeed has been applied; RADAR II can even lock to time code in reverse!

Manual or Automatic Punching with Undo

Punch-ins or punch-outs can be done in exactly the same way as on a tape recorder. You may arm tracks on the fly, punch into record manually on the fly, and/or punch into record automatically at marked punch points. RADAR II's accuracy enables you to reliably punch the same location(s) over and over - and its undo feature allows you to experiment with punch-ins until they are perfect!

Because of RADAR II's unmatched processing power, there is no limit to the number of tracks that can be simultaneously punched, and RADAR II's smooth adjustable crossfades make for seamless punch points.

Modular System with Upgrade Path

RADAR II can be purchased initially as a 24-track recorder with one internal 9GB hard disk drive. The chassis is ready to accept up to two additional devices to expand the system's recording capacity, or to integrate a backup tape drive into the system. All external devices are mounted in removable disk carriers for fast, easy swapping.

Otari also offers the EDB-3 external disk drive chassis– this option adds up to three external disk drives for additional recording capacity, and can include a tape subsystem for archiving audio recorded on RADAR II. A RADAR II system with this option can record on the internal drives, the external drives, or both. For more information about these options, please contact your Otari representative.

Flexible Drive Configurations

RADAR II may be fitted with many combinations of storage and backup media, enabling you to customize the system's performance to your unique requirements. Besides standard hard disk media, Otari supports magneto-optical (MO) media, JAZ™ removable media, and a variety of tape-based backup devices including Exabyte and Travan. As new media and new technologies come to the forefront, RADAR II is poised to incorporate them - extending the value of your investment.

RADAR II Session Controller

The RADAR II Session Controller is a dedicated remote control surface with all the features you'd expect from an Otari remote: track arming buttons, transport, auto-location, and editing controls... plus a jog/shuttle wheel for accurate editing.

48 track arming buttons enable one Session Controller to operate two systems in a RADARLINK configuration.

A new architecture allows for direct access to commonly used menu items. In addition, Macro Keys enable you to program common button-press sequences - these can be stored, then recalled at the touch of a button.

Separate Meter Bridge

The RADAR II Session Controller incorporates a separate meter bridge that attaches to the main body of the Controller with a supplied bracket. In large-format configurations, a second meter bridge may be mounted next to the standard one, for level display of tracks 25 through 48.

Since the meter bridge is a separate unit, it may be mounted behind your console meterbridge, or near your RADARVIEW monitor.

RADARVIEW Graphical Display Option

RADARVIEW provides a graphical display of track meter values, sync settings, edit parameters, and will scroll a large block representation of each track including locate points. *Please note that the* RADARVIEW *software is provided as standard; however the user must purchase an Otari-approved graphics accelerator card and an appropriate video monitor in order to take advantage of the feature.*

SONY 9-pin Serial Machine Control

The Sony BVU-950 Serial Machine Control interface is now supported by RADAR II. This enables your system to operate the transport controls of any externally-connected devicethat supports the popular Sony 9-pin interface!

TDIFLINK (option)

The TDIFLINK option enables you to transfer up to 24 tracks of digital audio to or from RADAR II. The TDIFLINK option may be used between RADAR II and tape-based equipment compliant with the format, or even between separate RADAR II systems!

RADARLINK Multi-system Operation

For installations requiring more than 24 tracks, Otari provides RADARLINK, which enables up to five RADAR II systems to be linked together, and operated from a single RADAR II Session Controller.

UFC-24 Universal Format Converter

Otari's UFC-24 Universal Format Converter can turns the digital Tower of Babel in many studio environments into a smooth-running machine. Otari's UFC-24 converts - - -.

Complete On-Board Diagnostics

RADAR II's standard system software includes a comprehensive set of diagnostic tools to keep the system in top shape.

Remote Modem Diagnostics

To enable Otari Technical Support personnel to monitor operation of remote systems, a Remote Modem Diagnostic mode is provided. Using a standard v.32 (14.4kbps) or v.34 (28.8 kbps) <u>external</u> modem (not included), one RADAR II system can monitor or control a remote system, in order to isolate and correct problems. *Please note that the remote modem diagnostics software is provided standard - the external modem is not provided by Otari.*

1.3 AN OVERVIEW OF HARD DISK RECORDING

The term Hard Disk Recording refers to the conversion of analog audio signals from a microphone or instrument into digital form (data) and storing it on a hard disk drive. A hard disk could be compared to a roll of tape used in analog recording.

This is where the comparison ends, because once the data is stored on the disk it can be manipulated in ways much superior to tape (such as less generational loss during copying, instant location to any point with in the program material and word processor or sequencer type editing of sound.)

The digital conversion process is done by the analog-to-digital converter which takes a snapshot (sample) of the analog signal forty-four(or forty-eight) thousand times a second and transforms it into a number. This number is represented as a word in binary form eg. 1010110010100101. RADAR II is a 24-bit system meaning that the data word has 16.7 million different levels of resolution per sample. This sample is sent to RADAR II's DSP (Digital Signal Processing) unit and on to the disk drive where it is stored as a tiny magnetized area.

A hard disk is similar to a phonograph in that it has spinning platters and a pickup mechanism. The main difference would be that the pickup arm of a hard disk never makes contact with the platter, but merely hovers over it and reads the data magnetically. Hard disk technology has improved dramatically in the last few years to the point where disk lifetime is measured in hundreds of thousands of hours of constant use; this is with absolutely no maintenance.

Converting back to audio form is done when the drive reads the data and sends it back to the CPU. From the CPU, the signals travel to the digital-to-analog converters and on to the mixer to become sound again. When sound is recorded and played back digitally it accumulates extremely low levels of distortion from analog to digital and back to analog form. The dynamic range (the difference between the quietest and loudest sounds) of the original signal is preserved so well that compression or gain riding is unnecessary to achieve a high signal to noise ratio.

1.4 MANUAL OVERVIEW

This manual is organized as follows:

Section 1   Welcome & Introduction
                        Introduction to this manual
                        Product Description
                        Hardware Specifications
                        Controls & Indicators

Section 2   Product Overview of Operation/Getting Started!

Section 3   Recording & Transport Operation

Section 4   RADAR II Menu Features

Section 5   External Synchronization Features

Section 6   Session Controller Features

Section 7   RADAR II Editing Features

Section 8   Backup/Restore Operation

Appendix A   Hardware/Software Installation

Appendix B   Diagnostics/Maintenance

Appendix C   ADATLINK (Option) Operation

Appendix D   RADARLINK Operation

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About this Manual

This manual is a comprehensive guide to operating RADAR II, and covers all of the functions available at the time of printing.

Explanations of some recording basics are provided to help the less experienced operator.

How to Avoid Reading this Manual!

While we put lots of effort into creating up-to-date, accurate, and lively documentation, we know how often people actually read the manual.

THEREFORE! Save yourself time and trouble– be sure to read the Product Overview/Getting Started section (Section 2)!

1.5   RADAR II HARDWARE SPECIFICATIONS

1.5.1 AC Power

IMPORTANT!

It is extremely important when first hooking up RADAR II that, before the unit is powered up, the line voltage selector switch is correctly set. If this is set incorrectly, this could extensively damage RADAR II's internal circuitry.

RADAR II has a universal power supply that can accommodate AC voltages and frequencies anywhere in the world. The standards used by different countries fall in either of two ranges - 100 to 120 volts at 50/60 Hz or 220 to 240 volts at 50 Hz. A switch on the back panel of RADAR II determines which of these is to be used to provide power.

Power Requirements: Switchable between AC 50/60 Hz, 100/120 V +5/-10%
or AC 50 Hz, 220/240 V +5/-10%

Power Consumption: 250 VA Max

Certifications: UL, CSA, and FCC Class "A" certified

1.5.2 Audio Inputs & Outputs

RADAR II has 24 audio input and outputson the rear panel. Three DB-25 female connectors are used for input- one connector per eight tracks - and three more are used for output (again, one connector per eight output tracks.) Each connector is bolted directly to the chassis for maximum strength. *Wiring diagrams for the audio inputs/outputs appears in Appendix A.*

Please Note: RADAR II Inputs and Outputs are cross-coupled, so that both input and output levels stay the same if one side is using an unbalanced cable and the other is using a balanced cable.

An Overview of Level Standards and Balancing

RADAR II can accept the two most common standards of analog input and output defined by the terms "plus 4" and minus 10". Generally, professional studio equipment's inputs and outputs are balanced signals with the 0 VU level set at +4 dBu. Semi-professional and consumer equipment's inputs and outputs are generally unbalanced signals, with 0 VU set to -10 dBV. These standards evolved from the different paths taken by separate industries developing their own audio equipment. To obtain an optimum signal to noise ratio, your mixing console and RADAR II should be set to the same level; separate switches are provided on RADAR II's rear panel for selecting input and output level.

Balanced vs. Unbalanced Signals: Balanced audio cable has three conductors: two conductors carrying the same signal at opposite polarities and a ground. Balancing generally results in lower susceptibility to electromagnetic (EMI) and radio frequency (RFI) induced noise, and permits longer cable runs without risk of interference. As well, balanced cables do not necessarily need to be grounded at both ends and this means fewer ground loop problems.

On the other hand, unbalanced cables have two conductors only: one for signal and one for return. The return must always be grounded in order for signal to flow. This scheme is more susceptible to radio or electromagnetic interference and poor quality cables can be noisy if they are handled. Many studios, however, successfully use unbalanced lines and they should not present problems if the equipment in the studio is properly grounded. *Wiring diagrams for balanced and unbalanced cables appears in Appendix A.*

1.5.3 Input and Output Reference Levels

Zero dB in digital audio equipment is the maximum signal level that an input device such as a mixer, effects unit or recording machine can accept to gain optimum signal-to-noise ratio before distorting. When a VU meter shows an input signal level of 0 VU, +4 gear will be actually 4 dB above .775 volts RMS. When the meter shows 0 VU on -10 gear, the signal is 10 dB below 1 volt RMS. RADAR II will adjust its meter sensitivity to your selection.

RADAR II can accept either of the two standards for reference level; +4 and -10. These levels may be set via RADAR II's Setup menu. *(For further information, please refer to §4.X or Appendix A.)*

1.5.4 Grounding

The analog audio circuitry in RADAR II operates with a separate ground, which is not connected to the AC power ground. This allows the user to determine the grounding scheme that best suits their studio's requirements.

There are two grounding terminals on RADAR II's back panel; CHS GND is connected directly to the metal chassis and the ground wire of the incoming AC power line. ANA GND is connected to the sleeve of each audio input and output including the SMPTE In and Out.

RADAR II is shipped with the ANA GND and the CHS GND connected. If grounding problems do occur (hum or excessive crosstalk), the ANA GND and CHS GND may be unstrapped, and/or the analog ground may be connected to the technical ground shared by other equipment in the studio.

1.6 CONTROLS & INDICATORS

Please Note: This information is provided to familiarize you with your RADAR II.
Complete installation instructions appear in Appendix A.

1.6.1 Rear Panel Connectors

1.   Audio Inputs (Analog)
2.   Audio Outputs (Analog)
3.   Connects to Session Controller
4.   RADARLink In, Out
5.   SONY 9-Pin Serial Machine Control
6.   VGA Monitor Output
7.   External SCSI Port
8.   Analog & Chassis Ground Points
9.   PC Keyboard Input
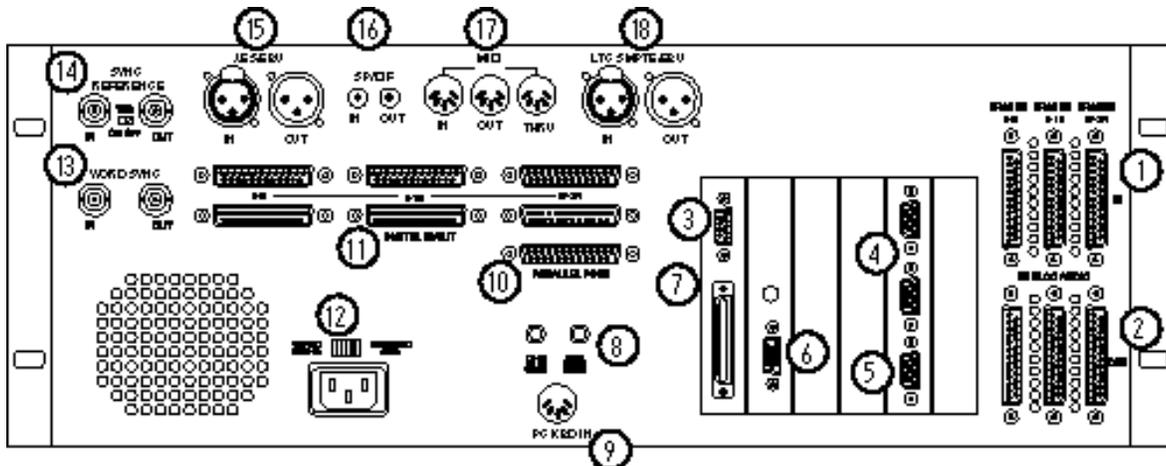
10.   Parallel Port (Printer, etc.)
11.   Digital Audio Interface Ports
12.   Power Input Module/Voltage Select
13.   Word Clock Sync Input
14.   Video Sync Reference
15.   AES/EBU Input/Output
16.   SP/DIF Input/Output
17.   MIDI In/Out/Through Connections
18.   Time Code Input/Output

1.6.2 RADAR II Fr ont Panel Controls & Indicators

Refer to this diagram to navigate RADAR II's Front Panel:

1: Power On/Off switch: For more information see §2.4

2: Floppy Drive: High density 3.5 inch floppy disk drive for software upgrades & occasional file import. *(See Appendix A for further information.)*

3: Drive Bay 1:   Can hold one half-height hard disk drive in a removable carrier. Basic installation contains one 9GB hard disk drive.

4: Drive Bay 2:   Can hold one half-height hard disk drive in a removable carrier. Basic installation contains one 8mm tape backup unit.

IMPORTANT!

System boot software is already installed on the RADAR II hard drive; therefore it is not necessary to put the supplied system software diskette in the disk drive. Do, however, keep the system diskette handy should it be needed in the future.

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Section 2 Product Overview/Getting Started!

This section includes the following subsections.

2.1 GENERAL

This section provides information on how to get started quickly and trouble-free on RADAR II. This section divides into subsections which describe some helpful RADAR II features, and provides some basic operation.

For convenience, a brief installation overview is provided here; however Appendix A provides complete system installation instructions.

2.2 BEFORE STARTING - PLEASE READ THIS!

In order to avoid inconveniencing yourself, and/or to avoid damaging the system, follow a few precautions:

2.2.1 AC Power Level Setting

PLEASE CHECK the AC voltage setting on the back panel for the proper line voltage for your area! If you set this incorrectly, poor system performance (and/or smoke) may result!
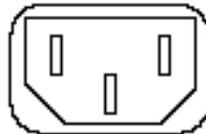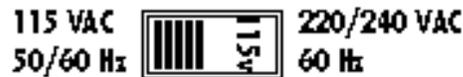
If the voltage setting is incorrect, use a flat-blade screwdriver to change it.

2.2.2 SCSI Terminator Installation

PLEASE CHECK that the SCSI terminator is attached to the rear panel's SCSI connector!

CAUTION!

If the terminator is not properly installed, poor system performance <u>will</u> result!
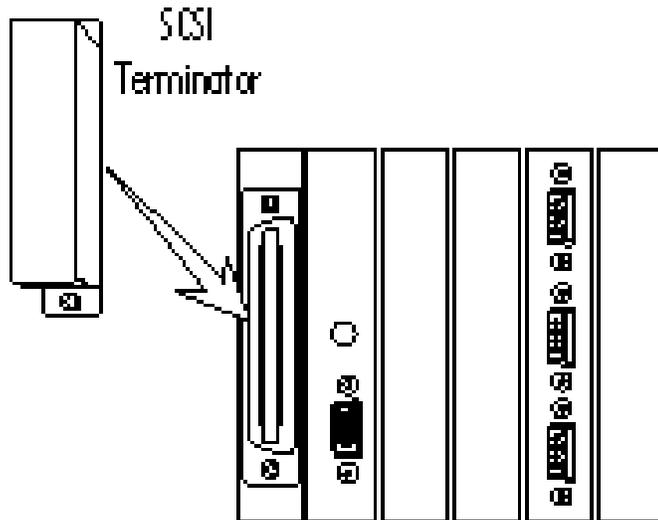
Please Note: If you have any external SCSI device(s) connected, make sure that the SCSI terminator is attached to one of the SCSI connectors on the external device.

2.3 AUDIO INPUTS/OUTPUTS

RADAR II provides 24 BALANCED inputs and outputs, using DB-25 (female) connectors (wired using the DA-88 standard.) Inputs/outputs may be balanced or unbalanced, +4 or −10 signal level. RADAR II's AES/EBU inputs and outputs use one XLR cable per pair; the S/PDIF inputs and outputs use RCA connectors.

TDIF inputs/outputs (optional) use DB-25 connectors wired as described in Appendix A.

Please Note: All wiring diagrams for RADAR II inputs/outputs appears in Appendix A.

2.3.1 About Audio Reference Levels

The Audio Level preference setting provides four level settings for the analog inputs, and four level settings for the analog outputs. The selections are:

- **+24 dBu**   - **+22 dBu**   - **+20 dBu**   - **+18 dBu**

These settings refer to scale (or maximum levels). Put another way, these are all +4 dBu operating levels, with +20, +18, +16, and +14 dBu of headroom.

Example: With RADAR II's input operating level set to +22, a tone of 0 VU coming from a +4 dBu console will cause RADAR II's meters to read -18 (dB below full scale).

If the "+24 dBu" input operating level is selected, the RADAR II meter(s) would show -20 (dB below full scale).

RADAR II audio reference levels are set via the Preferences menu (described in Section 4).

Be sure to consult your audio mixer's manual if you are unsure of the proper level at which to set RADAR II.

Please Note: The Input and output levels do not always have to be set to the same settings. This may be useful in the situation where a microphone preamp is connected directly to one of RADAR II's inputs and you are using an -+4dBubalanced mixing console.

2.3.2 Audio Connections - Analog

1.   Connect source audio to the Audio Inputs.

2.   Connect a console (or other monitoring system) to the corresponding outputs.

2.3.3 Audio Connections - Digital

RADAR II provides both AES-EBU (professional) and S/PDIF (consumer) digital audio interfaces as standard. AES/EBU uses one <u>balanced</u>, XLR cable per pair; S/PDIF uses one unbalanced RCA cable per pair.

RADAR II can record stereo digitally on any two track pairs, and can output digitally from any two adjacent track pairs. *Complete instructions for this feature appear in Section 3, §3.17.*

Please Note: Be sure to use the highest-quality shielded cables and best quality connectors for any digital audio application!

If using AES/EBU:

1. Connect an AES/EBU source to RADAR II's AES/EBU IN XLR (female XLR connector), as shown below.

2. Connect RADAR II's AES/EBU output to the desired device using a properly shielded cable and a female XLR cable connector, as shown.

If using S/PDIF:

1. Connect an S/PDIF source to RADAR II's S/PDIF IN XLR (female RCA jack), as shown below.

2. Connect RADAR II's S/PDIF output to the desired device using a properly shielded cable and a male RCA cable connector, as shown.
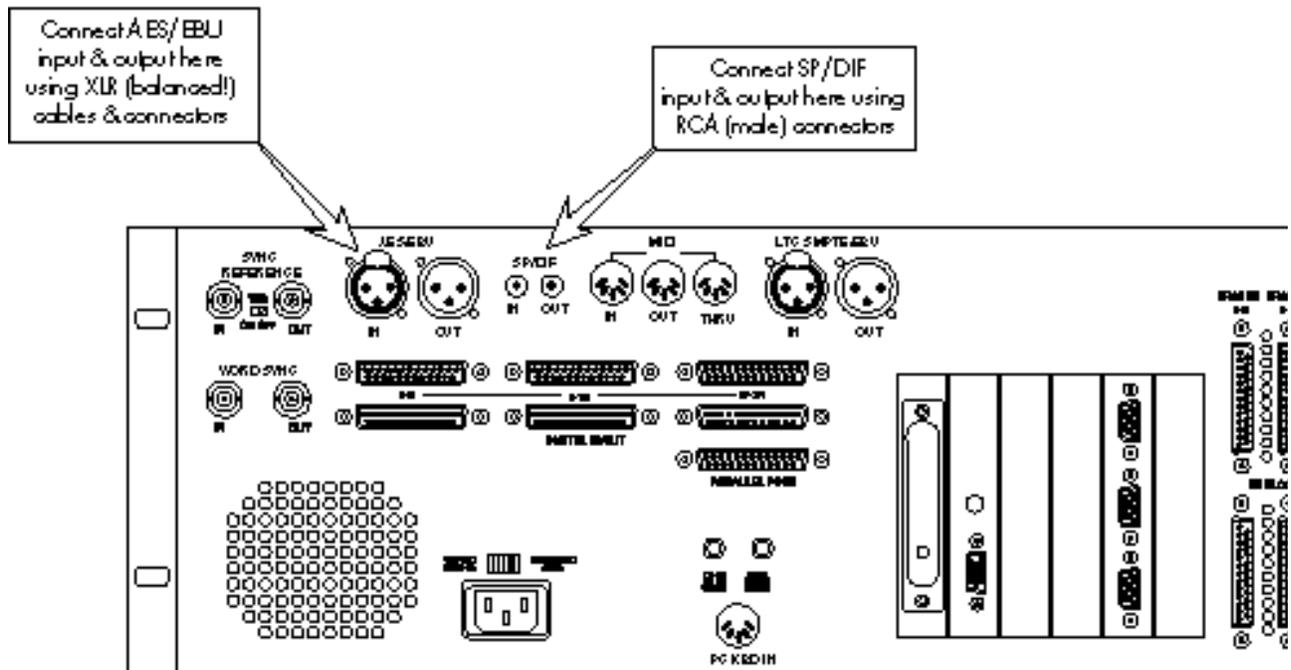
If using TFIFLink:

1. Connect the TDIFLink Output to the TDIFLINK OUT connectors on the rear panel.

2. *(If TDIFLink input is needed)* Connect the TDIFLink input to the TDIFLINK IN connectors on the rear panel.
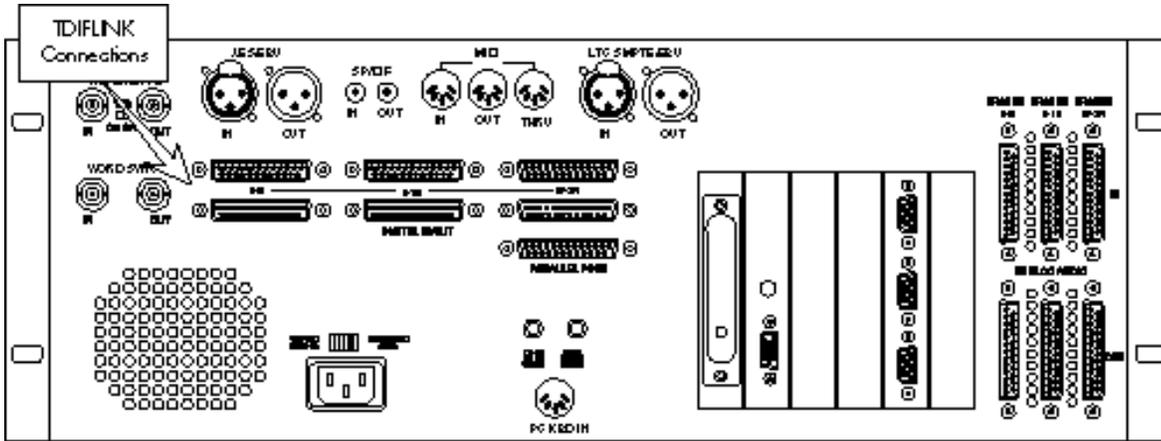
2.4 POWER ON/OFF PROCEDURE

2.4.1 Power Up Procedure

Please Note: Turn any external SCSI device's power on before turning on RADAR II.

Press the power switch located on the left side of the Front Panel of RADAR II to the On position. RADAR II will take a few moments to go through its power-up routine, and the LCD will display the following patterns:

```
        RADAR
   DIGITAL 24 TRACK
```

Then....

```
   DRIVES FOUND:   1
   TESTING SCSI:   1
```

Then....

```
   Booting from
   Floppy....
```

Then....

```
   Booting from
   SCSI 0: \
```

Then....

```
   00:00:00:00.00
      * MOUNTING *
```

And finally...

```
   00:00:00:00.00
   LOC:01
```

This display means that RADAR II is ready for operation. The LCD display shows the current SMPTE location, and current location point.

2.4.2 POWER OFF PROCEDURE

IMPORTANT: DO NOT SWITCH OFF BEFORE MENU SHUTDOWN.
Before pressing the power switch to power down, you must have
RADAR II save system data to the hard disks.

Power Off from the RE-8:

1.   **On the Session Controller, press MENU/PREV (located on the Address
Keypad).** The system will display the Main Menu.

2.   Use the DOWN cursor key to scroll to the last sub-menu, or simply turn
the jog wheel to the right until SHUTDOWN RADAR appears in the
LCD:

> ```
> MAIN MENU:
> SHUTDOWN RADAR
> ```

3.   Press ENTER. RADAR II will ask you to confirm the shutdown.

> ```
> SYSTEM SHUTDOWN
> PROCEED?   NO
> ```

4.   **Use the Cursor up/down keys to change between NO and YES (or turn
the Jog Wheel to make the selection.) Press ENTER.**   The LCD will
indicate it is saving the current system state, then confirm a safe shutdown:

> ```
> YOU MAY SAFELY
> TURN OFF POWER
> ```

5.   **Turn the power switch OFF.**

Please Note: After a shutdown, RADAR II cannot be operated again until the power has
been switched off then on!

2.5 ARMING TRACKS OVERVIEW

The Session Controller has track arming buttons for up to 48 tracks (two RADAR II systems) - when tracks are armed, the button(s) show red flashing lights.

1. **Arm the track(s) you want to record on using the track arm buttons on the Session Controller.**

2. **Cue and start the audio source.** You will see input levels on the Meter Bridge:
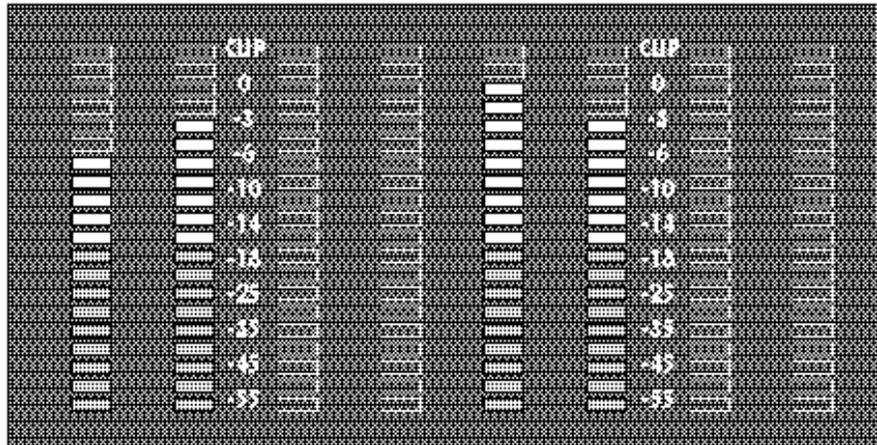
3. **While watching the levels display(s) on the meter bridge, set the audio input levels to a safe (i.e. non-clipping) level using the console, etc.**

IMPORTANT NOTE: The maximum recording level allowable before digital clip is +22 dBu. This level corresponds to 0dB on RADAR II's meter display.

Clip Indicator LEDs: The red Clip LED located at the top of each individual meter indicates that the input signal has clipped. More information about the Clip Indicators appears in §3.3.2.

2.6 RECORDING & PLAYBACK OVERVIEW

Recording and playback use the transport buttons on the Session Controller.

1. **To enter record, press/hold PLAY then press REC, or...**
   press/hold REC and press PLAY.
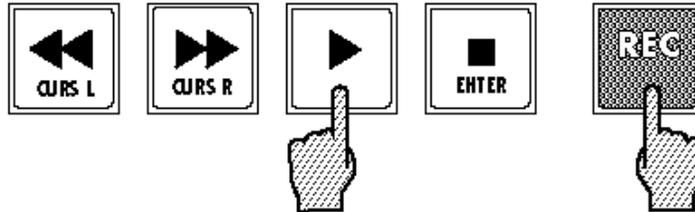
2. **Press PLAY to drop out of record with the transport still rolling, or press STOP to stop both recording and the transport as well.**

3. **To enter PLAY at any time, simply press the PLAY button.**

Please Note : Two methods of entering RECORD are provided– the traditional two-button method, or the record button only. The desired method may be selected under Preferences, described in Section 4, §4.3.4.5.

Please Note: RADAR II supports recording either in 16-bit (default) or 24-bit audio formats.   Recording format is specified on a project basis - once a project is started in one format, it cannot be converted to the other. The recording format may be selected under Preferences, described in Section 4, §4.3.X.X.

2.7 LOCATING IN THE RECORDED AUDIO

RADAR II provides a number of methods for locating the transport - you may use the transport controls or Jog/Shuttle features, you may enter the desired time and locate there, or you may set and recall autolocate points.

Please Note: Instructions on RADAR II's AutoLocator and direct time entry features are provided in Section 3, §3.12.

2.7.1 Locating Using Fast Wind Buttons

You may use the fast-wind buttons to locate forward or backwards in the audio.

Please Note: Press the button once to fast-wind at six times play speed. Or, double-press the button to fast-wind at eighteen times play speed. (Other speed settings for fast-wind may be specified on the Preferences menu, described in §4.3.4.)

Cue to Audio You may use RECALL LOC plus the Fast Wind buttons to skip to the beginning or end of a silent section. *This feature is described in §3.12.1.2.*

2.7.2 JOG/Shuttle Operation

RADAR II's Jog/Shuttle modes provide fast, precise location in recorded material. Shuttle Mode uses the Jog Wheel to vary the speed and direction of audio for locating points; Jog Mode allows you to "scrub" the audio to find exact locations.

Please Note: The Jog Wheel may also be used as a convenient control device when scrolling through RADAR II's menus. When used as an input device, turning the wheel to the right increases the value on screen, and turning it to the left decreases the value

2.7.2.1 Entering Jog Mode
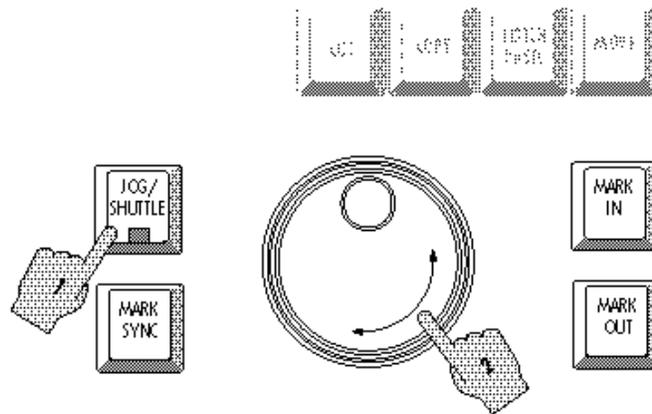
Press the JOG/SHUTTLE button to the left of the wheel to engage JOG mode:

Turning the wheel clockwise or counterclockwise produces variable speed playback for as long as you continue turning it. When you stop turning the wheel, playback will stop. The speed of playback varies from scrub where you can accurately locate the first transient of an audio waveform by rocking the wheel gently forward and backward to slightly above normal playback speed.

Jog "Bump": You may "bump" the current location while in SCRUB by pressing the cursor left or right buttons. Each cursor press will nudge the jog location by the smallest possible wheel increment.

To exit Jog mode, press any button (including the JOG/SHUTTLE button.)

2.7.2.2 Entering Shuttle Mode
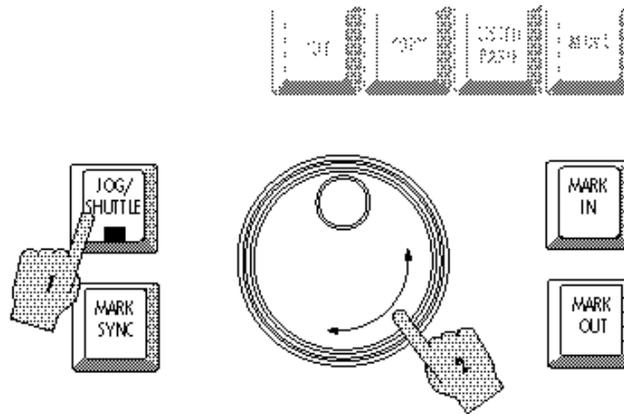
Press the JOG/SHUTTLE button TWICE to engage Shuttle mode:

Shuttle produces playback at variable speeds like Jog with one difference; when you stop turning the wheel, playback continues at the current speed until you move the wheel again or press a Transport button.

To exit Shuttle mode, press any button including the Jog/Shuttle button.

2.8 DISK TIME AVAILABLE

To check the amount of disk time available to you, press/hold the cursor left and right arrows. The display will show the amount of free time on the system's hard disk.

The display is in <u>actual</u> recording minutes available based on the current track arm status - for example, if you have 20 minutes of track time available on Disk 1, and no tracks armed, it shows 20 minutes. If, however, you have two tracks armed for recording, it will show 10 minutes (i.e. 10 minutes per track x 2 tracks = 20 minutes).

```
RECORD TIME LEFT
A051
```
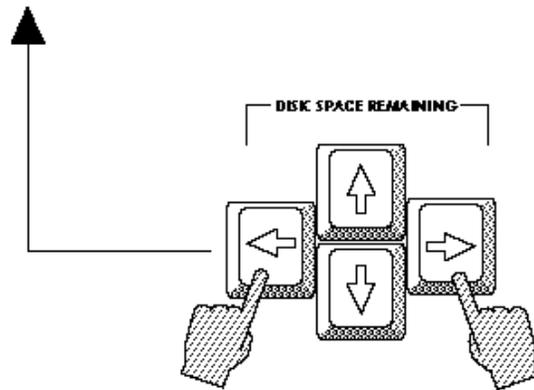
Please Note: Disk Time Available is also available as an item on the System Menu. (§4.3.1), and in the RADARVIEW display (§4.12).

2.9 NAVIGATING RADAR II'S MENUS

2.9.1 Menus Overview

RADAR II provides a set of menus on the LCD display for access to features that are used less often and do not require a dedicated button.

The Menu system consists of layers of topics ranging from general categories (five) to more specific functions; many of these end in what we call a "dialog", which is a menu that needs your input.

When you press the MENU button on the Session Controller, the LCD screen presents you with a Main Menu, which includes the most general listing of topics:

SYSTEM MENU
PROJECT MENU
EDIT MENU
PREFERENCES MENU
DIAGNOSTIC MENU, and...

SHUTDOWN RADAR

From these choices, you select more specific items called submenus. From a submenu, you will be presented with an editing dialog or an additional submenu.

2.9.2 Moving Around in Menus

The Menu/Prev and Enter buttons, plus the cursor buttons, are used to enter/exit the menu and to travel up and down through the menu system, as shown.

The Jog Wheel may be used to scroll quickly through menus - and when a menu item is selected requiring input, the jog wheel may be used to "dial in" a value.

RE-8 Keypad/Cursor Keys
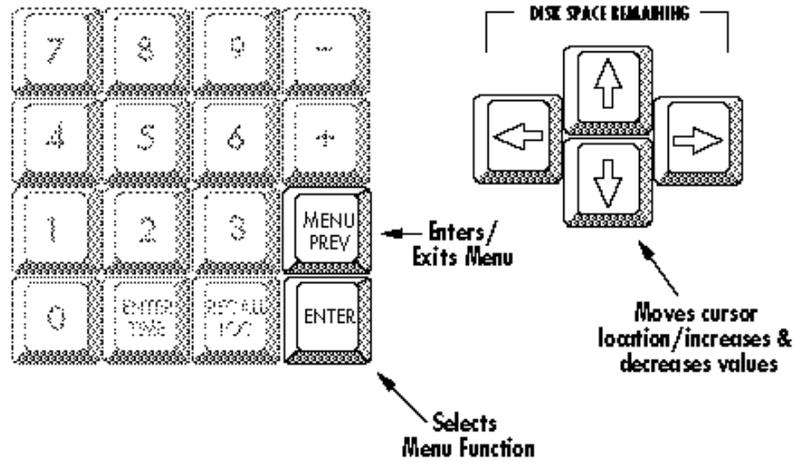
2.9.3 Navigating the Menu

Press MENU/PREV to enter the Menu. (Press again or press CANCEL to exit.)

Please Note: You may enter the Menu while playing or recording without interrupting either mode. Transport controls are inactive until you exit Menu mode.

Pressing MENU/PREV any time you are within the Menu will cancel the last entry and present the previous (higher-level) menu. You can continue pressing MENU/PREV to cycle backward through the submenus and exit to Ready mode, or... you may press CANCEL at any time to leave the Menu and any other dialog screen right away.   To select an item (or a submenu), press the ENTER key.

2.9.4 Menu Structure

The Main menu is available by pressing the MENU/PREV button. Use the UP and DOWN cursor keys or the Jog Wheel to scroll through these listings.

Please Note: For a detailed description of all menu items, please refer to Section 4.

System Menu

SYSTEM VERSION
SHOW DISK SPACE
DIGITAL I/O
DISK CONFIG
RADARLINK
RADARLINK SOLO
MACHINE CONTROL
RS-422 DEVICE ID
SET TIME & DATE
UPGRADE SYSTEM

Project Menu

BACKUP MENU
RESTORE MENU
GOTO PROJECT
CREATE PROJECT
NAME PROJECT
COPY PROJECT
DELETE PROJECT
RENUMBER PROJECT
SAMPLE RATE
AUDIO FORMAT
TC FORMAT
TC RATE
START TIME
SYNC OFFSET
SMPTE LOCK SPEED
FREEWHEEL TIME
DISPLAY MODE
MIDI TEMPO MAP
NAME TRACK
RECLAIM SPACE
RENUMBER LOCATES
ERASE ALL DISKS

Edit Menu

UNDO/REDO
MODIFY EDIT
CUT
COPY
PASTE
MOVE
ERASE
LOOP
SLIDE
INSERT
REVERSE
LISTEN
MUTE TRACKS
IMPORT *.WAV
CROSSFADE TIME
RECORD SAFE

Preferences Menu

DEFAULT SMPTE FIELD
SHOW SUBFRAMES
DEFAULT SAMPLE RATE
DEFAULT AUDIO FORMAT
DEFAULT TC FORMAT
DEFAULT TC RATE
DEFAULT START TIME
SYNC OUTPUT
STATIC SMPTE OUT
TRACK SOLO MODE
LOW DISK WARNING
SLIDE TIME UNITS
RECORD MODE
FFWD & REW RATE
PEAK HOLD TIME
CLIP HOLD TIME
SAVE STATE DELAY
AUTO RECLAIM
RADARLINK ID
RADARLINK CABLE
AUDIO LEVEL

Diagnostics Menu

SCAN SCSI BUS
MOUNT / UNMOUNT
INIT DISK
CHECK DISK
REPAIR DISK
JAZ PROTECT
JAZ UNPROTECT
SHOW DEFECT LIST
VERIFY DISKS
COPY HARD DISKS
SHOW FREE RAM
CHECK PROJECT
REALTIME ERRORS
MODEM MENU
CONFIGURE DEBUG
SHOW DEBUG
SAVE DEBUG
METER TEST
KEY TEST
LED TEST
DISPLAY TEST 1
DISPLAY TEST 2
DISPLAY TEST 3

Shutdown RADAR

2.10 RADAR II PROJECTS OPERATION

In many ways, RADAR II behaves exactly like a reel-to-reel tape machine. However, RADAR II provides many important features that are only possible because of the random-access nature of hard disk digital recording.

RADAR II supports up to 99 different projects, each of which is a playlist with its own material, locate points, Sampling Rate, Sync Offset, and Start Time.

With multiple projects, you may create, say, a *Project 01* that starts at SMPTE time code of one hour; you may then create a new *Project 02*, that has completely different recorded material, but also starts at SMPTE time code of one hour!

Another advantage of multiple projects is when editing - you may edit *Project 02* as needed, without changing *Project 01* in any way; you may record new material into a project without overwriting material in any other project. *(The only limitation is the amount of free recording time, which is shared among all projects.)*

A third advantage of RADAR II's project architecture is that you may copy material between projects using the editing clipboard, and you may also copy entire projects! Thus, you may record raw material into *Project 01*, then copy *'01* to *'03*. You can then edit *Project 03* as desired - but the original *Project 01* is always available in its un-edited form!

Please Note: Because projects are simply "playlists", copying material between projects does <u>not</u> reduce the amount of free recording time.

2.10.1 Default Project

When RADAR II boots on a "clean" system, it automatically creates and loads an empty project 01... you may use this project as desired (or all the time - since you are not forced to use the multiple-projects feature if you don't need to!)

Please Note: RADAR II remembers the last active project number on shutdown, and re-loads it on power-up.

2.10.2 Creating a New Project

When you want to create a new project, select CREATE PROJECT from the Project menu. You may then enter a name for the new project - RADAR II assigns the first available Project number, which appears on the 2-digit LED of the RE-8. *Projects are saved immediately to disk after creation.*

2.10.3 Switching Between Projects

To change the current Project, select "GOTO PROJECT" from the Project menu. The system will display the current on the system; use the UP and DOWN buttons, the cursor arrows, or the jog wheel to display the desired project, then press ENTER to select it.

2.10.4 Naming Projects

To name a project:

1. **Select Name Project from the Project menu.**

2. **Use the up/down arrows (or the jog wheel) to select the project to rename, then use the RE-8 QWERTY keyboard to enter the name.**

Please Note: By pressing/holding the SHIFT button on the Session Controller, you may type in names using UPPERCASE letters via the QWERTY keyboard.

Please Note: On the front panel, use the cursor left/right buttons to move on the LCD display. Use the UP and DOWN buttons to select letters. Press/hold UP or DOWN to scroll quickly through the available characters.

Each project may be named with up to 13 characters. (The system allows you to enter a 16-character name, but the last three characters may be erased if the project is ever copied.) *If a project is never explicitly named, it uses the name "UNTITLED".*

2.10.5 Naming Tracks

In addition to naming the entire project, RADAR II enables you to name individual tracks in the project. To name tracks:

1. **Select Name Tracks from the Project menu.**

2. **Using the Track Arm buttons, select the track (one or more) to be named.**

3. **Use the Session Controller QWERTY keyboard to enter the name for that track (or group of tracks.)**

Please Note: By pressing/holding the SHIFT button on the Session Controller and its QWERTY keys, you may type UPPER CASE letters into track names.

Please Note: On the front panel, use the cursor left/right buttons to move on the LCD display. Use the UP and DOWN buttons to select letters. Press/hold UP or DOWN to scroll quickly through the available characters.

Each track name may use up to 13 characters. *Track names appear in the RADARVIEW display (see §2.12).*

2.10.6 Copying Projects

To copy a project:

1. **Change to the project to be copied** *(if not there already.)*

2. **Select Copy Project from the Project menu.** RADAR II will then copy the current project to the first unused Project location, append the project name with the suffix "V 2", then change to that project. *(If you copy the project from V 2, the suffix changes to V 3, etc.)*

2.10.7 Project Start Time

Each Project may have a user-definable "start time", which is simply a reference marker, since recording over the entire 24-hour span is available. When switching to a project, the system automatically locates to the Start Time.; this time is also available in the project as location point 0.

The default start time for projects is 00:00:00:00.00; to enter a different start time, select Start Time from the Project menu, then enter the desired time.

2.10.8 Project Sample Rate

Like Start Times, different projects may have different sample rates. To change the sample rate, first switch to the project (if not already active), then select Sample Rate from the Project menu. Use the UP/DOWN buttons or the Jog wheel to select the desired sample rate, then press ENTER.

2.10.9 Deleting Projects

If you are finished with a project and want to remove it from the system, first change to the project to be deleted (if not there already.) Select Delete Project from the Project menu. The system will ask for a confirmation, then the project playlist will be deleted, and the project number marked as unused.

Please Note: Audio used by a deleted project is NOT deleted until a "reclaim space" operation is performed, or Auto Reclaim is enabled (see below).

2.10.10 Reclaiming Disk Space from Deleted Projects

Since multiple projects can reference the same audio, when deleting a project, its playlist information (and locate points) are deleted, but the audio is NOT deleted. Also, as edits are performed, small amounts of disk space are used for crossfades, etc. This audio may not be released after a cut or erase operation; the Reclaim Space feature will release the space.

The "reclaim space" feature processes all projects on the system to determine what audio is not being referenced by any project. Once finished with the processing, RADAR II erases the unused audio data, reclaiming the space for future use.

IMPORTANT: *Audio deleted using Reclaim Space is <u>not</u> recoverable!* Also, the process may take up to five minutes to complete, depending on the number of projects on the system.

To use Reclaim Space, select this item from the Projects menu, then press ENTER. *We recommend you perform this operation occasionally, to free up unused disk space on your system.*

2.10.11 Auto Reclaim Feature

The Auto Reclaim feature, available from the Preferences menu, enables the system to automatically reclaim space whenever possible, without operator intervention.

Please Note: Auto Reclaim is enabled by default.

If Auto Reclaim is disabled, the system retains entire audio files, even if only a small clip is being referenced by playlists. With Auto Reclaim enabled, if you start out with a 10-minute recording and edit or repunch so that only 5 seconds of the original recording is referenced, the system only retains the audible five seconds. The unused 9 minutes and 55 seconds of inaccessible recording space is freed up for further use.

Audio file storage is not trimmed or reclaimed unless the audio is no longer accessible by the current project, the UNDO memory, or the editing clipboard memory. RADAR II automatically tracks which audio files are shared between multiple projects and does NOT automatically trim or delete any shared audio files.

Please Note: The manual Reclaim Space menu item is still required to trim or reclaim any audio space that was shared by multiple projects.

2.11 EDITING– AN OVERVIEW

RADAR II provides all editing features possible with tape and a razor blade, plus many more. Like a tape machine, you may mark and cut across all tracks; unlike a tape machine, you may cut on one track (or across any combination of tracks).

2.11.1 Edit Markers (MARK IN, MARK SYNC, MARK OUT)

In tape editing, the operator rocks reels to find edit points, then uses a grease pencil to mark them. Finally, edits are performed using a razor, at the marked edit points.

In RADAR II editing, you rock reels to find edit points (or mark points on the fly, or set specific time code locations). Then, instead of the grease pencil, you set special mark points called MARK IN and MARK OUT. You may set these using the dedicated buttons on the Session Controller, as shown.
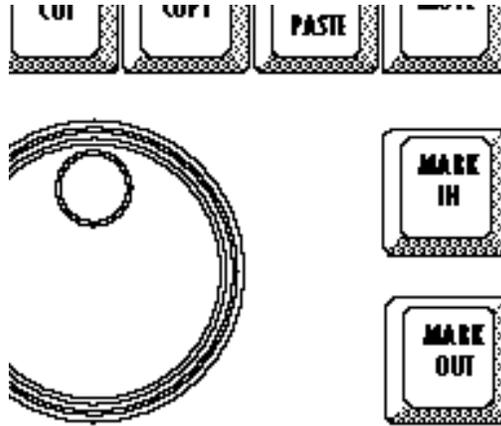
Once the Mark In and Mark Out points are set, the edit is performed using dedicated edit function buttons or RADAR II's Edit menu. The only additional steps in RADAR II editing beyond those in tape are in selecting which track(s) you want to edit– these are selected using the track arm buttons.

Mark Sync

In addition to the In and Out points, RADAR II supports a Mark Sync feature, which is extremely useful in video post applications and any time when you need to edit based on an event during a piece of clipboard audio, etc. For example, if the production calls for a recorded clip of a car crash, you would mark the IN point as the beginning of the tire screech, and the OUT point at the end of the crash. However, to most accurately spot this effect to video, you can mark a "SYNC" point - in this example you'd mark the impact using the MARK SYNC key to the left of the Jog Wheel.

Then, when spotting the effect, you set the IN, SYNC, and OUT points, copy the effect to the clipboard, cue the video to the point of impact, and PASTE the clip

into position. If a SYNC point is present in the clipboard material, the car crash effect will be pre- and post-timed around that impact. This feature enables you to get the effect spotted precisely on the first attempt.

• **To mark a SYNC point, press the MARK SYNC key.**

2.11.2 RADAR II's Editing Clipboard

In tape editing, after you cut a piece for use elsewhere, you might hang it over your shoulder if it is short, or wind it onto an edit reel if it is longer. RADAR II uses a "clipboard" for storing cut or copied pieces. Once audio is on the clipboard, it may be auditioned for content, and used elsewhere as needed.

<u>Auditioning the Clipboar d:</u> You may audition the contents of the Editing Clipboard by pressing the Session Controller's SHIFT plus the PASTE/LISTEN key, or you may select the LISTEN function from the Edit menu.

2.12 RADARVIEW GRAPHICAL INTERFACE

RADARVIEW is an optional graphical display option, which shows track meter values, sync settings, edit parameters, and locate points, and also scrolls a large block represesentation of each track playlist.

Active tracks are displayed in blue; soloed tracks are displayed in green.

Please Note: RADARVIEW software is included free as a part of the system. However, to display the information, you must provide an Otari-approved graphics accelerator card and multi-sync color video monitor. See your Otari dealer for a list of approved hardware!

2.12.1 Track Window Zoom

The RADARVIEW track window provides 14 zoom levels, allowing you to view as little as four seconds of audio full-screen, or as much as 24 hours.

To change the zoom setting, hold the Z key on the Session Controller, then press " + " to zoom in (expand), or " - " to zoom out (shrink).

2.12.2 Screen Saver Delay

RADARVIEW provides a Screen Saver feature, which disables the RADARVIEW screen after a predetermined time with no system activity. Any system activity (any button press, any transport movement, any track meter level changes) will re-enable the monitor display.

Please Note: The default Screen Saver delay time is 1 minute of system inactivity.

You may change this delay time via the SCREEN SAVER item (under the Preferences menu.)

Section 3   Recording & Transport Operation

This section describes RADAR's Transport features, and the extensive control menus used for recording and editing, including installation and basic operation.

This section includes the following subsections.

SECTION 3 CONTENTS, CONTINUED

3.1 GENERAL

RADAR II is designed with the best features of tape machines in mind - particularly its simplicity of operation. This will allow you to learn the operation of RADAR II quickly and be productive with a minimum of down time.

This section describes recording and transport operation, including arming tracks, input monitoring, recording, playback monitoring, and all transport locate features including shuttle/jog and autolocation.

3.2 ARMING TRACKS FOR RECORD

There are 48 buttons on the Session Controller, which are used to place tracks in Record Ready mode. *(These are referred to in this manual as Track Arm buttons.)* The buttons are momentary type with an LED in the center to indicate Record Ready status, and when tracks are armed, the button(s) show red flashing lights. Tracks may be armed in all transport modes including Record mode. Press any armed track's button again to disarm, and its LED will go out.

1.   **Arm the track(s) you want to record on using the track arm buttons, then cue and start the audio source.** You will see input levels on the Meter Bridge level meters:
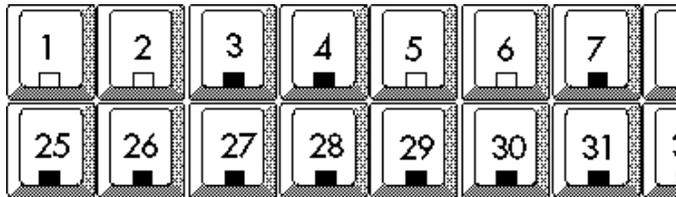
Session Controller Track Arm Buttons
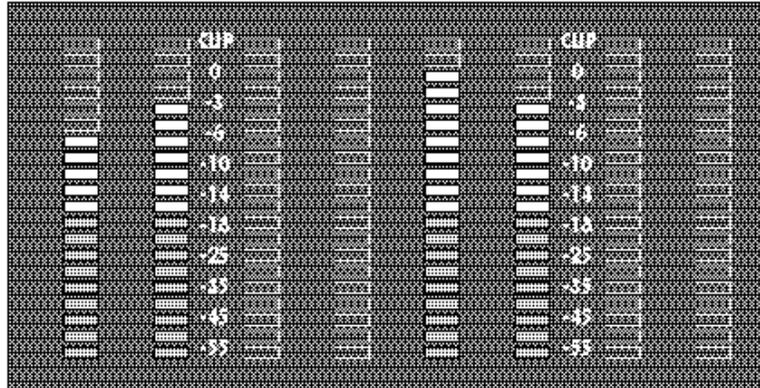
Meter Bridge Display

2.   While watching the levels display(s), set the audio input levels to a safe (i.e. non-clipping) level using the console, etc.

Please Note: If your audio source is producing insufficient levels for recording, you may need to re-set the Reference Level settings via the Preferences menu. *These settings are described in §X.X.*

IMPORTANT NOTE: The maximum recording level allowable before digital clip is +22 dBu. This level corresponds to 0dB on RADAR II's meter display.

3.3 MONITORING/METERS DISPLAY

RADAR II's meter bridge provide instant and highly accurate input level indication. Each individual meter has 20 LED parts: 10 green and 10 yellow. The LEDs are calibrated to display a logarithmic scale from 0dB down to –55dB.

3.3.1 Peak Hold Feature

RADAR II uses Peak Program ballistics with Peak Hold for input and output metering. This type of metering most accurately allows you to assess transient peaks that could overload RADAR II and cause distortion. The top LED will register a peak and will hold it momentarily before falling more slowly than the other LEDs. In a dynamic section, the top LED will show an average of the peaks it encounters.

Please Note: The Peak Hold duration may be set on the Preferences menu, described in §4.3.4.7.

3.3.2 Clip Indicator LEDs

The red Clip LED located at the top of each individual meter indicates that the input signal has clipped. If clipping occurs, this LED will glow brightly for a moment and then remain dim. The activity of the Clip Indicator LEDs may be set on the User Preferences menu, described in §4.3.4.8.

Please Note: If a clip occurs, once you have reset the input level and no longer need to see the Clip LED, press the track arm button associated with the clipped track off and then back on.

3.4 PROJECT AUDIO FORMAT SELECTION

3.4.1 Audio Format Overview

RADAR II can record projects using either 16-bit or true 24-bit audio format.

24-bit audio provides the ultimate quality in digital audio - however, 24-bit projects uses up disk space faster, take longer to back up and restore, and may not be compatible with earlier hardware/software products.

16-bit projects offer excellent audio quality, use less disk space, back up and restore faster, and maintain compatibility with earlier hardware and software that may not support 24-bit audio. (16-bit RADAR II projects may be backed up onto tape, and restored onto RADAR I systems. However, 24-bit projects cannot be transferred to earlier RADAR systems.)

RADAR II may have both 16-bit and 24-bit projects on the same hard disk(s) simultaneously - however the projects cannot share audio files.

Please Note: You must make this selection before starting a new project. After the project is started in one format, it cannot be changed to the other.

- **To select/change the default Audio Format, select the DEF AUDIO FORMAT item from the Preferences menu.**

3.4.2 Changing RADAR II's Default Audio Format

1. **Press the MENU/PREV button.**

2. **Scroll UP/DOWN through the choices until the PREFERENCES menu item is displayed.**

```
MAIN MENU:
PREFERENCES MENU
```

3.   **Press ENTER.**

4.   Scroll through the submenus until the Default Audio Format item is displayed:

```
MAIN/PREFS MENU
DEF AUDIO FORMAT
```

5..   **Press ENTER.** The system will respond with:

```
DEF AUDIO FORMAT
   16-BIT PCM
```

6.   **Use the cursor up/down keys (or the Jog wheel) to select the desired default Audio Format for the project.**   The available choices are 16-Bit PCM (default) and 24-Bit PCM.

7.   **When you have selected the desired Audio Format, press ENTER.** This will automatically accept the selection and escape from the menu.

Please Note: Default Audio Format setting is retained by the current project, and will be recalled on the next power up.

3.5 SAMPLE RATE SELECTION

3.5.1 Sampling Rate Overview

The number of times every second that a snapshot of the input audio signal is taken is referred to as the sampling rate. RADAR II supports all currently used sampling rates: 32 kHz, 44.056 kHz, 44.100 kHz, 47.952 kHz, and 48 kHz.

The most important fact to consider before recording is that if you ever want to transfer tracks between RADAR II and another machine digitally, their sampling rates must be the same. For instance, if you have a stereo rhythm track recorded on DAT at 48 kHz sampling rate and you want to transfer it to RADAR II to build up a piece of music, RADAR II's sampling rate must match that of the DAT recording at 48 kHz. If the sampling rates were set differently, the resulting playback on RADAR II would be altered in pitch.

Below is a chart showing some applications of various sample rates.

3.5.2 Changing RADAR II's Sample Rate

1.   Press the MENU/PREV button.

2.   Scroll UP/DOWN through the choices until the PROJECT menu item is displayed.

3.   Press ENTER.

4.   Scroll through the submenus until the Sample Rate item is displayed:

5..   Press ENTER. The system will respond with:

6.   Use the cursor up/down keys (or the Jog wheel) to select the desired Sample Rate for the project,.   The available rates are 32, 44.1, 44.056, 47.952, and 48 kHz.

7.   When you have selected the desired sample rate, press ENTER. This will automatically accept the selection and escape from the menu.

Please Note: Sample Rate setting is retained by the current project, and will be recalled on the next power up. Other projects may have different sample rates; however once a project has been created, its sample rate is retained.

3.6 RECORDING OPERATION

Recording and playback use the transport buttons on Session Controller.

Please Note: Digital I/O recording and playback features are provided in §3.18.

3.6.1 Entering Record

- **To enter record, press/hold PLAY then press REC, or...
  press/hold REC and press PLAY.** The lights on the armed tracks stop flashing and are lit steadily.

Please Note: You may select the method used to enter RECORD (either PLAY + RECORD, or just RECORD) on the Preferences menu, described in §4.3.4.5.
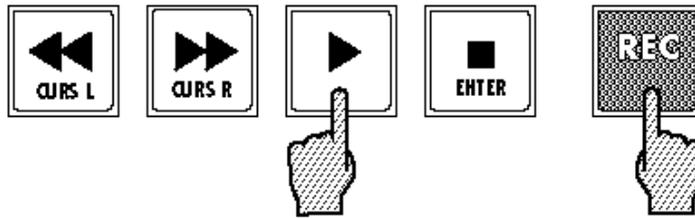
3.6.2 Punching In on Additional Tracks

RADAR II provides on-the fly punch in for additional tracks while recording.

1.   **With RADAR II already in record on some tracks, arm the desired additional tracks.** (The track arm lights of the current record tracks are on solid; the track arm lights for the additional tracks will flash.)

2.   **To enter record on the additional armed tracks, press PLAY and RECORD together.** (All track arm lights are now on solid.)

Please Note: When tracks are armed during RECORD, they will not actually begin recording until you press the RECORD button while holding PLAY. However, the "Instant Record" feature, available on the Preferences menu, enables you to "drop" tracks into record on the fly, simply by arming their tracks(s). This feature is described in §4.3.4.5.

3.6.3 Punch Out (Dropping Out of Record)

- Press PLAY to drop out of record with the transport still rolling, or press STOP to stop both recording and the transport as well.

If you are monitoring playback material before and after the record punch-in, the system switches seamlessly to the input material on the punch in, then back to playback monitoring after the punch out.

If the operating conditions are right (determined by disk activity--- see §3.6.3.2), RADAR II automatically provides seamless punch-out monitoring. In all other cases, playback monitoring returns momentarily after the punch-out.

3.6.3.1 Standard Audible Punch Out

RADAR II is a truly random-access recorder. Since the act of punching out of record is, as far as RADAR II can tell, a purely random action, it cannot always have the underlying program material immediately available for playback. (A tape machine can simply switch to the playback head, and the correct playback material is right there!)

Please Note: On RADAR II, the audio is always <u>recorded</u> seamlessly; it is only the playback monitoring that takes a moment to return after the punch.

To emulate the features of tape recorders as closely as possible, RADAR II provides the punch-out playback instantly when possible. If the disks are playing and/or recording on all tracks, the punch-out playback will return, but with a brief delay. For more information about the necessary conditions for seamless punch-out, see §3.6.3.2.

3.6.3.2 Seamless Punch Out Monitoring

RADAR II's disk drives support a maximum of 24 tracks of audio data, either playback or record. If you perform a punch-in/punch out recording operation, the punch-out will be seamless (i.e. no gap - a smooth switch between input and track monitoring), if the following condition is met:

The punch-out monitoring will be seamless if the number of "free" disk tracks equals or exceeds the number of tracks you are recording on that disk unit.

Seamless punch-out will occur under these conditions:

You have recorded 12 tracks of audio in a project, on tracks 1, through 12. (Tracks 13 through 24 are not active in this project.)

You rewind the transport, then arm tracks 11 and 12 to do an overdub. Before you punch in, you will be monitoring tracks 1 through 12; on the punch in, you will be playback monitoring tracks 1 through 10, and input monitoring on tracks 11 and 12.

When you punch out of record, tracks 11 and 12 switch instantly to playback monitoring, while tracks 1 through 10 stay in playback monitor.

Seamless punch-out will NOT occur under these conditions:

You have recorded on tracks 1 through 20.

You rewind the transport, then arm tracks 1 through 4 for an overdub. When you punch in, monitoring switches automatically from playback to input; however when you punch out, there is a brief (sub 1 second) delay. *The seamless punch out does not occur because the disk's throughput would have exceeded its 24-track limit!*

What if I <u>really</u> have to get a seamless punch out here???

In these situations, you may make use of RADAR II's MUTE TRACKS feature, available under the Edit menu. With Mute Tracks, you may temporarily "turn off" tracks that are not in use, increasing the amount of disk drive throughput. In the above example, you would use MUTE TRACKS to temporarily mute tracks 5 and 6; the disk overhead would allow you to punch in on tracks 1 through 4, and get a seamless punch-out on all four tracks.

Please Note: Track Solo/Track Mute features are monitor functions, and do not affect the amount of disk activity. You must use the MUTE TRACKS feature (Edit Menu, §7.13) to temporarily turn off unneeded tracks.

The MUTE TRACKS dialog can be quickly displayed by pressing the M key on the Session Controller. (The function is still accessible from the Edit Menu.)

3.6.4 Record Safe Feature

The record-ready buttons may be placed in and out of "REC SAFE" mode using the CLEAR/SAFE button on the Session Controller.

Pressing this button turns off all REC-READYs; pressing it again returns the previously rec-readied tracks to REC-READY status.

3.6.5 Clear REC-READY

You may use the CLEAR/SAFE button to clear all REC-READied tracks– simply press the SHIFT button (upper right corner of Session Controller) then press CLEAR/SAFE. This clears all REC-READied tracks (or all soloed tracks.)

3.6.6 Recording to Time Code

RADAR II will record while synced to an external time code source, enabling frame-accurate editing to almost any external source. Time code features are described in Section 5.

3.7 PLAYBACK OPERATION

3.7.1 Standard Playback

RADAR II provides two playback modes - forward play and reverse play. In addition, playback may be vari-speeded, or locked to an incoming sync source.

Please Note: Playback locked to external sync is described in §5.4.

- •   Press the PLAY button to enter PLAY at any time.

- •   Press the STOP button to STOP playback.

3.7.2 Reverse Playback

To enter Reverse Play from the current location, press the Rewind and Play buttons simultaneously. *You may even do this while the transport is already in PLAY!*

3.7.3 Playback to Time Code

RADAR II will play back while synced to an external time code source, enabling frame-accurate lock to almost any external source. This feature is described in Section 5, §5.3.3.

3.8 TRACK SOLO FEATURE

RADAR II provides a Track Solo feature for auditioning individual or multiple tracks *on playback,* while muting the remaining tracks. TRACK SOLO is also useful as a stereo-in-place solo function if your mixing desk is not capable of this.

Track Solo uses a dedicated button on the RE-8, with the Track Arm buttons acting as Solo buttons.

Please Note: Three Track Solo modes are provided - Additive, Interlock, and Momentary. A description of each mode appears below. The desired mode may be selected through the Preferences menu, described in §4.3.4.2.

3.8.1 Additive Solo Mode Operation

In Additive Solo mode, each time a track solo button is pressed, the track is "added" to any others being soloed, as follows:

1. **Press the TRACK SOLO button.** The button's LED will flash quickly and the LCD will prompt:

2. **Choose one or several tracks from the Track Arming group.** When selected, the track arming LEDs will blink for each soloed track. You may now perform all transport operations <u>except</u> recording.

Please Note: During playback, the meters will show levels for only those tracks soloed.

3. **To take a soloed track out of Solo mode, simply press its track arm button again.** Its LED will turn off, and it will no longer appear on the meters.

4. **To disable TRACK SOLO,** press the Track Solo button again. Its LED will go out and you can resume normal operation. The tracks that were previously set in TRACK SOLO are remembered for the next time you engage this function.

3.8.2 Interlock Solo Mode Operation

In Interlock Solo mode (the system default; selectable from the Preferences menu), every time a Solo button is pressed, the previous soloed track(s) are taken out of Solo.

If you want to solo more than one track, simply press <u>and hold</u> the first track solo button, then select additional tracks to be soloed.

3.8.3 Momentary Solo Mode Operation

Momentary Solo mode (available from the Preferences menu) means that track(s) are kept in solo for as long as their solo buttons are held.

3.9 VARISPEED RECORDING/PLAYBACK

3.9.1 VARISPEED Overview

VARISPEED is used to change the speed (and pitch) of recording and playback. Potential uses of VARISPEED include: lowering the pitch of existing tracks during an overdub session so a vocalist can sing in a more comfortable range, thickening the voice by recording multiple tracks in altered pitches, and matching the tuning of recorded tracks with difficult to tune instruments such as a piano.

RADAR II's VARISPEED can be adjusted in terms of the percent of deviation from normal speed or Cents (hundredths of a semitone) deviation from A440 Hz. The range is variable from minus 15% or 241 cents to a maximum of plus 15% depending on the sample rate you use for your recording.

VARISPEED Variation/Ranges by Sample Rate:

Sample Rate	Plus	Minus
48	2.8% or 48 cents	43.75% or 995 cents
47.952	2.9 or 50 cents	43.69 or 993 cents
44.1	11.9% or 195 cents	38.77% or 848 cents
44.056	12% or 196 cents	38.71% or 847 cents
32	54.2% or 750 cents	15.62% or 293 cents

3.9.2 Changing Pitch With VARISPEED

<u>From the RE-8 and Front Panel:</u>

1.   **Press the VARISPEED button.** The system will respond with:

2.   **Press the UP/DOWN buttons to raise or lower the percentage value.** On the RE-8 you may enter a number using the Plus/Minus and numeric keys, or use the Jog Wheel to dial the number up or down. *(The cursor buttons and/or Jog wheel provide instant speed change - if you use the numeric entry method, the speed change occurs upon pressing Enter.)*

3.   **Press VARISPEED again to activate and return to Ready mode.** To enable and disable, press the VARISPEED button twice to enable, twice to disable. *This can be done during any transport mode, including Record.* The LED on the Vari-speed button indicates On/Off status.

Please Note: To check a VARISPEED value without turning the function Off, press VARISPEED, then CANCEL.

3.9.3 Changing VARISPEED Units

1.   Press the VARISPEED button.

2.   Press Cursor Right to move the cursor from the VARISPEED value field to the Units field.

3.   Use the UP/DOWN buttons to change from PERCENT to CENTS.

V-SPEED: **+00.00%**
UNITS: PERCENT

Session Controller Cursor Key

V-SPEED: +00.00%
UNITS: PERCENT

Session Controller Cursor Key

V-SPEED: +0000c
UNITS: CENTS

Session Controller Cursor Key

V-SPEED: +00.00%
UNITS: PERCENT

Session Controller Cursor Key
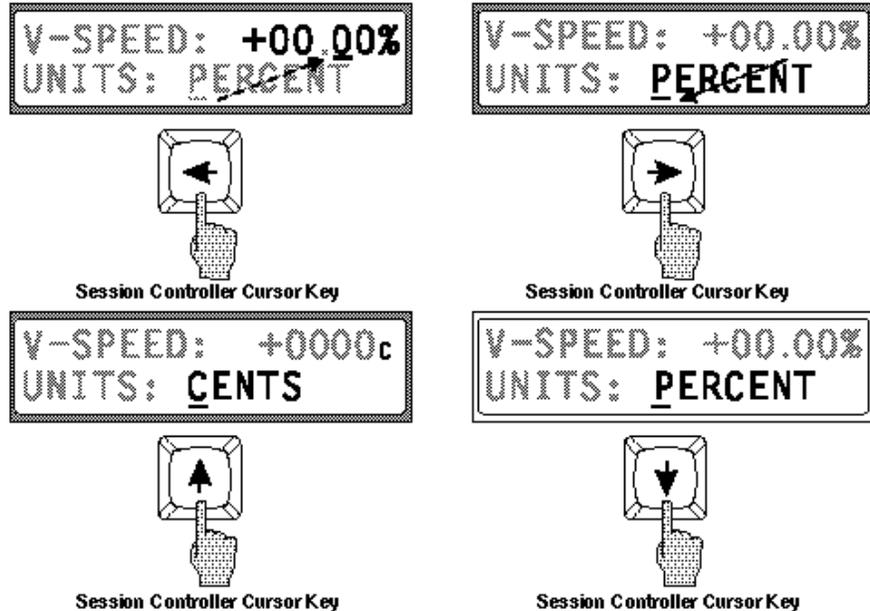
Press cursor-left to move the cursor back to the value field and use UP/DOWN buttons (or jog wheel) to adjust the amount of varispeed.

3.10 AUTO INPUT

3.10.1 AUTO INPUT Overview

AUTO*matic* INPUT *monitor* selects whether or not program material on record-readied tracks is monitored during playback. This feature has been provided because different recording situations require different monitoring strategies.

AUTO INPUT manages the monitor status of rec-readied tracks by monitoring existing track material during PLAY. When you enter RECORD, you will hear input material before switching back to track monitor when you exit RECORD. At other times (while the transport is in any mode besides PLAY), the inputs are monitored. *(When AUTO INPUT is Off, the input from any tracks armed will be monitored at all times, including record and playback.)*

3.10.2 Turning AUTO INPUT On and Off

Press the AUTO INPUT button to engage and disengage AUTO INPUT. The LED will light indicating automatic input monitoring is enabled. This function defaults to On when RADAR II powers up and, in most re cording circumstances, may be left On.

3.11 AUTO PUNCH

The AUTO PUNCH function is useful when you need to punch in and out at precisely timed location points. To get the absolute best performance of a single word or note, for example, RADAR II can handle the punching while you can concentrate exclusively on monitoring the performance.

Auto Punch uses the Mark In and Mark Out times as punch points, and is initiated from the Session Controller.

3.11.1 Setting-up for an AUTO PUNCH

<u>From the Session Controller:</u>

1.   **Using the Jog Wheel, Transport or Calculator, locate to the section you will be AUTO PUNCHing over.**

2   **Press the MARK IN and OUT buttons to define the beginning and end points, respectively, of the section.**

3.   **Arm the tracks to record upon using the Track Arm buttons. Press the AUTO PUNCH button.** The AUTO PUNCH LED will glow solid.

4.   **Locate before the section using the Transport or Locate functions.**

5.   **Hold PLAY and press Record.** RADAR II will automatically enter and exit Record when the MARK IN and OUT points are reached.

Press the AUTO PUNCH button to enable or disable this function.

3.11.2 Editing AUTO PUNCH In and Out locations

There are two ways to fine tune the AUTO PUNCH In and Out (Mark In and Mark Out) locations. On the Session Controller, you may use the Jog Wheel to scrub audibly to the exact location and press either of the MARK IN or OUT buttons. You may also use the EDIT LOC function (§X.X.X) to directly nudge the SMPTE times of the MARK points by frames or subframes.

Please Note: Complete procedures for scrub/shuttle operation are provided in §3.12.2.

3.12 UNDO/REDO FUNCTIONS

Probably one of the most useful features of RADAR II is the ability to undo a previous recording action or audio edit. You may UNDO a recording operation even after you use the transport controls to locate, play and rewind. The new take becomes permanent as soon as a you enter RECORD again.

There is no limit to the number of recorded tracks that an UNDO operation can be performed upon. You can UNDO a single syllable recorded on one track or an entire band on all 24. The only limiting factor is the amount of disk space remaining when you record. This is because when RADAR II records over previous audio, it is adding to the data on the disk drive, not overwriting like a tape machine. There is always a copy of the new and old takes as long as there is space for both.

Along with the UNDO function is the REDO function. REDO will "undo" the UNDO if you should decide to keep the new part after all.

<u>Performing an UNDO or REDO:</u>

1.   **Press the UNDO button after performing a RECORD or EDIT operation.** The display will read:

Please Note: RADAR II shows the last operation by name in the undo or redo menu. Thus, if the last action was a PASTE, the menu would read: "UNDO PASTE?"

2.   **Press ENTER.** RADAR II will UNDO the previous operation. Press CANCEL if you want to abort. Repeat this procedure to REDO.

Repeat this procedure to REDO.

Please Note: If there is no function to undo, the system will display:

3.13 LOCATING IN THE RECORDED MATERIAL

RADAR II provides five methods for locating in the recorded material:

Fast-Wind buttons	**"CUE TO AUDIO"**
Shuttle/Jog	**Autolocator Features**
Direct Time Entry	

3.13.1 Cueing with Fast Forward and Rewind

RADAR II is a random access device with any location point able to be cued virtually instantly. We have also retained Fast Wind functions for tape machine users.

3.13.1.1 Fast Forward/Rewind Operation

• Press either the Fast Forward (>>) or Rewind (<<) button once to fastwind the transport. (Normally, the fast wind rate is 6 times normal speed; this may be changed on the Preferences menu - see note below.)

• Press either button *twice* within 1 second to fastwind at 3 times the regular fast wind speed (nominally 18 times normal play speed.) Press the fast wind button again to slow the transport to the standard fast wind rate.

During these modes, the LCD display shows the changing SMPTE time and the names and numbers of any programmed location points passed during the wind.

Please Note: The standard Fast Wind speed is set to 6 times play speed. You may change this rate on the Preferences menu - described in Section 4, §4.3.4.6.

3.13.1.2 "CUE TO AUDIO" Using Fast Wind Buttons

RADAR II provides a powerful "Cue to Audio" feature that will, when selected "skip" the current transport location to the beginning of the current audio section, or - if in a silent section, "CUE TO AUDIO" will locate you to the next audio on the system.   This feature is very convenient for locating takes in a project that may be separated by large unrecorded gaps. CUE TO works by locating ahead (or back) to the nearest transition from audio program to silence. *If Track Solo is active, this feature operates using just the soloed tracks.*

To SKIP to the end of the current audio section:

Press RECALL LOC followed by FF to cue to the next transition of audio. Or...

Press RECALL LOC followed by REW to locate to the previous transition.

If you are currently in a silent section, RADAR II locates to the head (or tail) of the silent section.

3.13.2 Jog/Shuttle Mode

RADAR II's Jog/Shuttle modes provide fast, precise location in recorded material. Shuttle Mode uses the Jog Wheel to vary the speed and direction of audio for locating points; Jog Mode allows you to "scrub" the audio to find exact locations.

Please Note: The Jog Wheel may also be used as a convenient input device when prompted by the LCD to enter a numeric value, and also as a means of scrolling through RADAR II's menus. When used as an input device, turning the wheel to the right increases the value, and turning it to the left decreases the value.

3.13.2.1 Entering Jog Mode
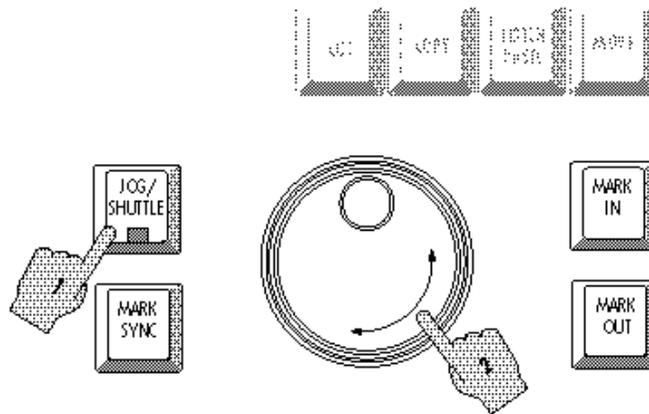
Press the Jog/Shuttle button to the left of the wheel to engage JOG mode:

Turning the wheel clockwise or counterclockwise produces variable speed playback for as long as you continue turning it. When you stop turning the wheel, playback will stop. The speed of playback varies from scrub where you can accurately locate the first transient of an audio waveform by rocking the wheel gently forward and backward to slightly above normal playback speed.

Jog "Bump": You may "bump" the current location while in JOG by pressing the cursor left or right buttons. Each cursor press will nudge the jog location by the smallest possible wheel increment.

__To exit Jog mode,__ press any button (including the Jog/Shuttle button.)

3.13.2.2 Entering Shuttle Mode
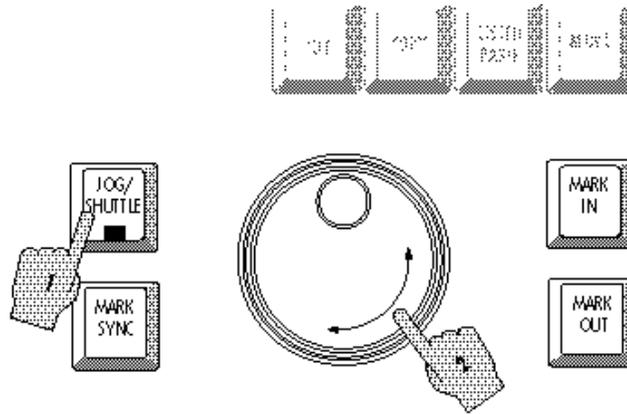
Press the Jog/Shuttle button TWICE to engage Shuttle mode:

Shuttle produces playback at variable speeds like Jog with one difference; when you stop turning the wheel, playback continues at the current speed until you move the wheel again or press a Transport button.

To exit Shuttle mode, press any button including the Jog/Shuttle button.

3.14 AUTO LOCATION

Because RADAR II is a hard disk recorder, you can instantly cue to a location without having to wait for rewind or fast forward. In this way, the program material is more like a phonograph record than a tape machine because you can drop the needle at the precise moment from which you want to start playback. You may program up to 99 location points with the ability to assign and edit each individual name and SMPTE location.

There are also three temporary points called MARK IN, MARK OUT, and MARK SYNC These are used to designate sections for AUTO PUNCH and Editing as well as being useful as quick locate points that you will not need permanently.

3.14.1 Programming a New Auto Location Point

On the Session Controller:

1.   **Press the MARK LOC button once for each location point you wish to store.** Programming may be done at any time during playback, recording, or stopped modes, and you may store multiple location points in one pass.

2.   **To program the temporary MARK points, press MARK IN and MARK OUT buttons.** Each subsequent button press overwrites the previous point.

RADAR II will automatically assign location numbers in the order in which they were programmed. For example: you have just programmed a locate point at 01:00:00:00 and RADAR II has assigned it as #1 . Next, you program another point at 01:00:05:00 and it is assigned point #2 . If you then rewind a bit and press MARK LOC at 01:00:03:00 this would become locate point #3. The most recently programmed point is set as the current locate point. You may also choose to enter new location points using the EDIT LOC function described in Editing a Locate, Mark In or Mark Out Point below. This may be preferable if you already know the SMPTE times at which you would like to have location points.

Please Note: The Renumber Locates menu item (under the Projects menu) re-numbers all Locate points in the current Project in SMPTE order. See §4.3.2.11 for more information about this feature.

3.14.2 Recalling a Locate Point

The RECALL LOC button is on the numeric keypad near the center of the Session Controller.

1.   **Press the Recall Loc button.** The LCD display will show a flashing R at its upper-right corner, as shown above.
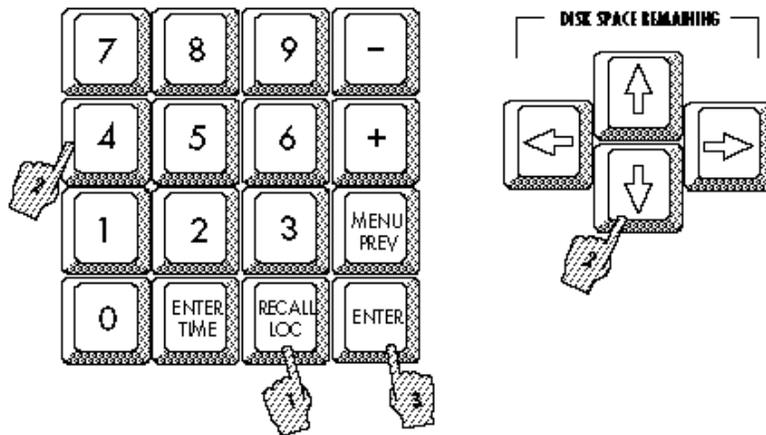
2.   **Use the cursor up and down arrows to scroll through the locate points,**
                    or...
        Enter the number of the locate point using the numeric keypad. *This locate point also becomes the default RECALL LOC point.*

SHORT CUT: You have the option of directly entering the number of the location point in the Calculator keys, or entering the first letter of any named location point using the QWERTY keyboard.

3. **Press ENTER to process the locate.**

3.14.3 AUTO PLAY after Locate

RADAR II begins playback automatically after a locate if "AUTO PLAY" is enabled. This is useful for quickly auditioning certain sections of a performance using RECALL LOC without having to press PLAY every time. This is also useful when you are recording; instead of pressing STOP to halt Record, you could press RECALL LOC with AUTO PLAY engaged and immediately hear playback of the take you have just recorded.

Auto Play is available from the Session Controller as a lighted button in the Utility Group:

If Auto Play is turned on, every time you locate the transport using the RECALL LOC feature, the system will play automatically. As mentioned above, this can be a time saver during repeated overdubs and voice-over operations.

3.14.5 Editing Locate, Mark In, or Mark Out Points

Using the EDIT LOC function, you can change the name and SMPTE time of any locate point or change the time of any MARK point. You can also enter new location points directly or delete them. All EDIT LOC operations may be performed during PLAY or STOP transport modes. *For more information on MARK In and Out see §6.12.*

Please Note: Edit Locate features use the EDIT LOC button, in the Utility section of the Session Controller.

From the Session Controller:

1.   **Press EDIT LOC.** The LCD displays the EDIT, DELETE, NEW, and SWAP options, along with the current locate point (if any).

2.   **Select the operation you require** (Edit, Delete, New, or SWAP) **using the Right and Left Arrows, then press ENTER.** The system will respond with a dialog that resembles Ready mode with the addition of a letter (E for EDIT, D for DELETE, or N for NEW) in the upper right-hand corner.

3.   Select the location point you want to edit by number (using the Numeric keys) or, in the case of the Mark In/Mark Out keys, simply press the desired mark key.

4.   Use the cursor left/right keys to move among the fields - you may use the cursor up/down keys to make changes, or use the numeric keypad to enter numbers, or, use the Jog Wheel to change the numbers.

5.   To assign or edit the name of the location (in EDIT or NEW only), press Cursor Right until the cursor is to the right of the LOCATION number. This places the cursor beneath the first letter of the name. Use the QWERTY keyboard to type or edit the nine character name.

Please Note: The Jog Wheel may be used to enter non-alphabet characters.

In the DELETE dialog, you may change only the location number to be deleted. **Use the cursor up/down keys or the Jog wheel to do this.**

6.   <u>SWAP Only.</u> The SWAP function provides a different screen when selected:

Use the cursor up/down keys to select the point(s) to be swapped– these include any numbered autolocator points, plus the Mark In and Mark Out points. Use the cursor left/right keys to move between rows on the LCD display.

7.   Press ENTER to complete the EDIT, DELETE, NEW, or SWAP operation and return to the initial EDIT LOC dialog.
             or...
Press EDIT LOC again to return to Ready mode or choose one of the EDIT, NEW or DELETE options.

3.15   LOCATING VIA DIRECT TIME ENTRY

This function allows you to cue the transport to an exact SMPTE location by typing it in on the Session Controller's numeric keypad. *This function is available during any transport mode, including Record.*

1. **Press the ENTER TIME button** The LCD will change to show the captured SMPTE time on the bottom line and the current time on the top line. If the transport is stopped, these numbers will be the same. In PLAY, the number on the top line will continue to increment. The cursor will be flashing beneath the frames or seconds field of the captured time.

2. **Enter the SMPTE time you want starting with frames, then seconds and finally minutes and hours.** (You may also use the arrow keys to move the cursor among the fields, so you may enter times directly.)
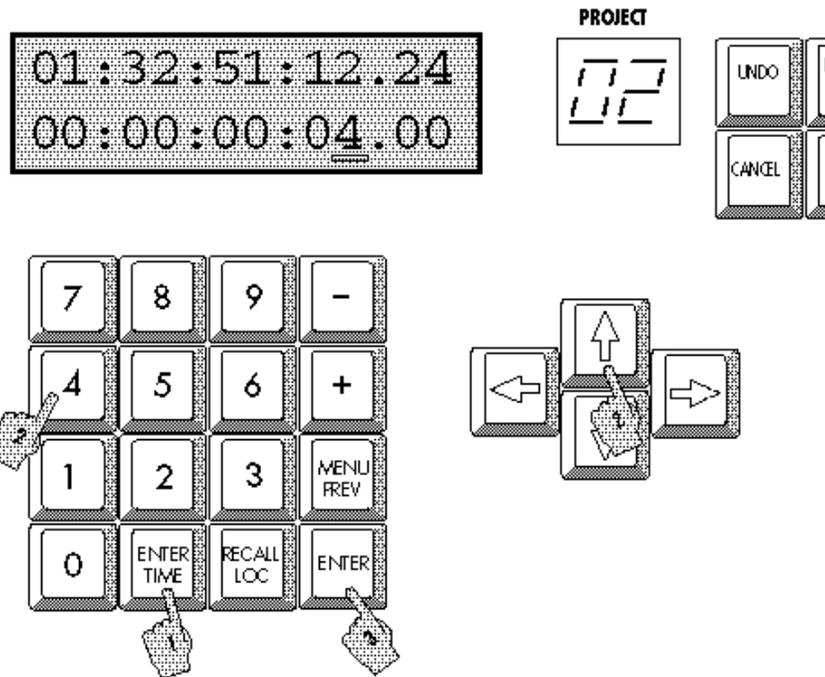
3. **Press ENTER to accept the new SMPTE location**. RADAR II will cue to the new location and return to Ready Mode.

+/– Shortcut: You may simply press the keypad + or – key followed by a numeric entry - this will add (or subtract) the entered value from the current location.

Please Note: You may change the "default" field of Enter Time so that when you select the function, the cursor is on the Seconds field rather than the Frames field. For information on changing this default setting, refer to §4.3.4.1.

3.16 CYCLE

CYCLE continuously plays back audio between the MARK In and MARK Out points. This feature is useful for repeating audio sections while you change equalization or rehearse a PUNCH IN.

<u>**Cycle Operation:**</u>

1. **Locate to the start of the section you want to cycle between using Transport and Jog Wheel.**

2. **Press PLAY.**

3. **Press the MARK In at the start of the section to repeat.**

4. **Press MARK OUT at the end of the section.**

5. **Press CYCLE.** Playback will automatically cycle between the two points.

6. **Press CYCLE again to disable.**

3.17 PRE/POST ROLL

PRE ROLL allows you to cue to a user definable time previous to any RECALLed LOCation point. It is useful when you need to hear the audio leading up to the LOCation point for PUNCH INs and do not want to add any more LOCation points. PRE ROLL also works with the CYCLE function by providing an extra few seconds of lead-in before the MARKed beginning and end points.

POST ROLL works along with the CYCLE mode to provide extra play-out time after the end point is reached.

Pro/Post Roll Operation:

1.   **Press the PRE ROLL button.** The dialog will show the default settings for both PRE and POST ROLL at two seconds each.

2.   **Press PRE ROLL again if you accept the default settings.**

         If you wish to edit these settings, press the LEFT or RIGHT Arrows to locate to the appropriate field and use the UP/DOWN buttons to change them.

3.   **Press PRE ROLL to accept the new settings and return to Ready Mode.**

To disable PRE ROLL, press the PRE ROLL button twice from Ready mode. To re-enable without changing, press twice again.

3.18 DIGITAL I/O OPERATION

RADAR II provides both AES/EBU and S/PDIF stereo digital interfaces, enabling up to two tracks of digital audio to be recorded or output. In addition, the TDIF format interface is available as options.

<u>TDIFLink:</u>
To be supplied. *TDIFLink operation is described in Appendix C.*

RADAR II's menu interface is used to specify the input and/or output track(s), and also the format to be used. Several conditions apply to Digital I/O operation:

- *As tracks are patched to the digital inputs, the corresponding analog inputs are inactive. (However, RADAR II tracks patched to digital outputs are still routed to the corresponding analog outputs.)*

- *RADAR II's user interface permits you to select a track number of 0 - this signifies that no track will be patched to the digital channel.*

Please Note: In both the AES/EBU and S/PDIF digital formats, digital wordclock is encoded with the audio on the same cable. Therefore, in normal operation, no additional digital wordclock is required.

<u>Digital I/O Operation:</u>

1.   **Connect a digital input source (either format) to the RADAR II's rear panel, according to the following diagram:**
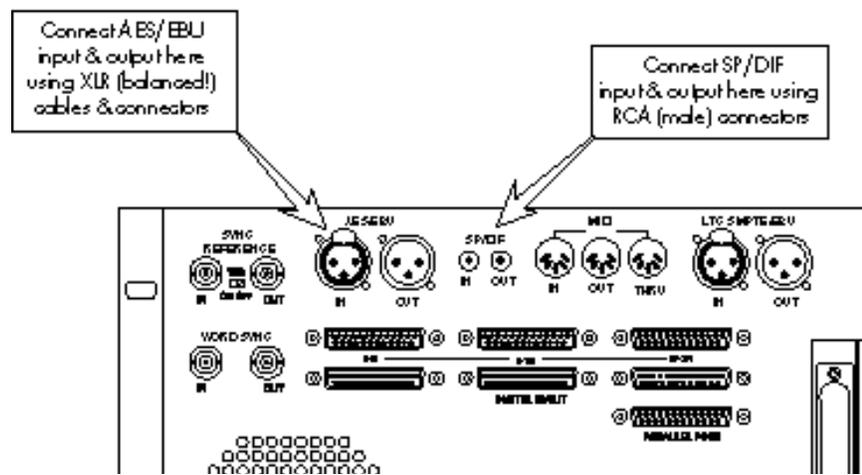
<u>Digital I/O format/routing selection from the Session Controller:</u>

1.   **Press the Digital I/O button.** The system will respond with:

2.   **Use the Cursor Up/Down keys (or the Jog wheel) to select the desired format ("AES/EBU, S/PDIF" or "TDIFLINK"), then press ENTER.**   (If you selected "AES/EBU, S/PDIF", the system responds with:)

3.   **Select the desired input (and output) tracks.   Use the Cursor Left/Right buttons and the Up/Down buttons to make your selection(s).**

Remember that the tracks must be from the same 8-track disk drive block (although they need not be adjacent to each other.) Also, specifying Track 00 means the channel will be inactive.

<u>Enabling Digital I/O Operation</u>

1.   **To enable Digital I/O operation, press the OFFSET/SYNC button.** The system will respond with the Sync Source dialog box, below. Use the cursor buttons (or jog wheel) to select Sync Source: Digital:

2.   **Press ENTER.** The system responds with a format query:

3.   **Select the desired digital I/O format (AES/EBU, S/PDIF, or TDIFLINK), then press ENTER.** The External Sync button(s) will flash to indicate that Digital I/O is now active.

Start the digital input source (if selected), or press PLAY to enable the digital output. *If digital input is active, you will see levels activity on the digital input channel(s) you selected.*

Please Note: TDIFLink setup/operation appears in Appendix C.

Section 4—Table of Contents, Continued

4.1 GENERAL

RADAR II provides a set of menus on the LCD display for access to features that are used less often and do not require their own dedicated buttons.

This section provides a description of general menu operation, and a complete description of each item in the menu structure. For menu item descriptions requiring detailed instructions, the appropriate paragraph reference is provided.

4.2 MENUS OVERVIEW

RADAR II's Menu system consists of layers of topics ranging from general categories (five) to more specific functions; many of these end in what we call a "dialog", which is simply a menu that requires your input.

4.2.1 RADAR II Menu - Top Level

When you press the MENU button on the RE-8 or the MENU/CANCEL button on the Front Panel, the LCD screen presents you with a Main Menu, which includes the most general listing of topics:

SYSTEM MENU
PROJECT MENU
EDI T MENU
PREFERENCES MENU
DI AGNOSTI C MENU,   and...
SHUTDOWN RADAR

From these choices, you may select a more specific layer called a submenu. And, from the submenu, you may be presented with an additional submenu.

4.2.2 Moving Around in Menus

Controlling the selection of submenus and changing values is done with the Jog Wheel or Arrow keys on the Session ControllerThese methods are described below.

4.2.2.1 Menu Operation using the Session Controller

The Menu/Prev and Enter buttons, plus the cursor buttons, are used to enter/exit the menu and to travel up and down through the menu system, as shown.The Jog Wheel may be used to scroll quickly through menus - and when a menu item is selected requiring input, the jog wheel may be used to "dial in" an value.
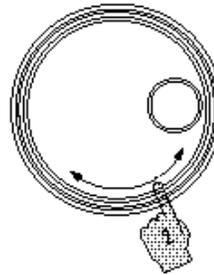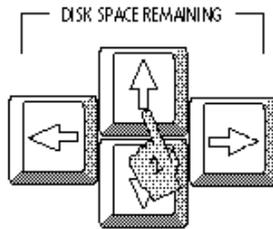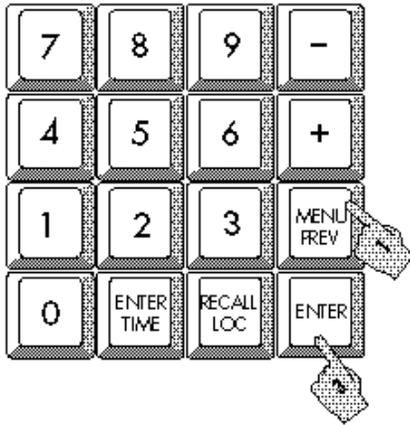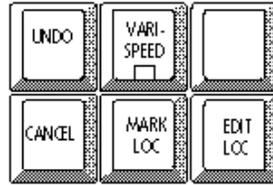
4.2.3 Menu Structure

The Main menu is available by pressing the MENU/PREV button. Use the cursor up/down buttons or the Jog Wheel to scroll through the listings

Please Note: The major categories are shown in boldface - to make selections from a major category, press ENTER while it is displayed, then use the cursor up/down arrows to move through the submenus.

4.2.4 Entering/Exiting the Menu

<u>**From the Session Controller:**</u>

1.   **Press MENU/PREV to enter the Menu.** The system responds with:

2.   **Use the Jog Wheel (or Cursor Up/Down keys) to display the desired submenu, then press ENTER to select it.**

3.   **To exit the menu at any time, press MENU/PREV or press CANCEL.**

Please Note: You may enter the Menu while playing or recording without interrupting either mode. Transport controls are inactive until you exit the Menu.

Upon entering the Menu, the LCD will display the first function. After a selection, the top line shows the current position in the menu hierarchy; the bottom line provides settings or additional submenus:

Please Note: If you have entered the Menu previously, your last selection will be shown on the display.

Pressing MENU/PREV any time you are within the Menu will cancel the last entry and present the PREVious dialog. You can continue pressing MENU/PREV to cycle backward through the submenus and exit.

You may press CANCEL at any time to leave the Menu and any other dialog screen.

System Menu

SYSTEM VERSION
SHOW DISK SPACE
DIGITAL I/O
DISK CONFIG
RADARLINK
RADARLINK SOLO
MACHINE CONTROL
RS-422 DEVICE ID
SET TIME & DATE
UPGRADE SYSTEM

Project Menu

BACKUP MENU
RESTORE MENU
GOTO PROJECT
CREATE PROJECT
NAME PROJECT
COPY PROJECT
DELETE PROJECT
RENUMBER PROJECT
SAMPLE RATE
AUDIO FORMAT
TC FORMAT
TC RATE
START TIME
SYNC OFFSET
SMPTE LOCK SPEED
FREEWHEEL TIME
DISPLAY MODE
MIDI TEMPO MAP
NAME TRACK
RECLAIM SPACE
RENUMBER LOCATES
ERASE ALL DISKS

Edit Menu

UNDO/REDO
MODIFY EDIT
CUT
COPY
PASTE
MOVE
ERASE
LOOP
SLIDE
INSERT
REVERSE
LISTEN
MUTE TRACKS
IMPORT *.WAV
CROSSFADE TIME
RECORD SAFE

Preferences Menu

DEFAULT SMPTE FIELD
SHOW SUBFRAMES
DEFAULT SAMPLE RATE
DEFAULT AUDIO FORMAT
DEFAULT TC FORMAT
DEFAULT TC RATE
DEFAULT START TIME
SYNC OUTPUT
STATIC SMPTE OUT
TRACK SOLO MODE
LOW DISK WARNING
SLIDE TIME UNITS
RECORD MODE
FFWD & REW RATE
PEAK HOLD TIME
CLIP HOLD TIME
SAVE STATE DELAY
AUTO RECLAIM
RADARLINK ID
RADARLINK CABLE
AUDIO LEVEL

Diagnostics Menu

SCAN SCSI BUS
MOUNT / UNMOUNT
INIT DISK
CHECK DISK
REPAIR DISK
JAZ PROTECT
JAZ UNPROTECT
SHOW DEFECT LIST
VERIFY DISKS
COPY HARD DISKS
SHOW FREE RAM
CHECK PROJECT
REALTIME ERRORS
MODEM MENU
CONFIGURE DEBUG
SHOW DEBUG
SAVE DEBUG
METER TEST
KEY TEST
LED TEST
DISPLAY TEST 1
DISPLAY TEST 2
DISPLAY TEST 3

Shutdown RADAR

4.2.5 Scrolling and Selecting Within the Menu

<u>**From the Session Controller**</u>

1. **After entering the Menu as above, press the UP/DOWN buttons to move the flashing cursor up or down vertically through the sub-menu options.**

2. **Press ENTER once you have reached the submenu you want.** The LCD will present the next submenu. Once you have reached the editing dialog you require, use the Cursor Left or Cursor Right button to move the cursor to another field.

The following diagram provides an example of the LCD menu operation - in this case, these are the submenu items under the System Menu:

Moving the Cursor inside Menu Dialogs:

This diagram shows how to move the cursor and change values in a menu dialog.
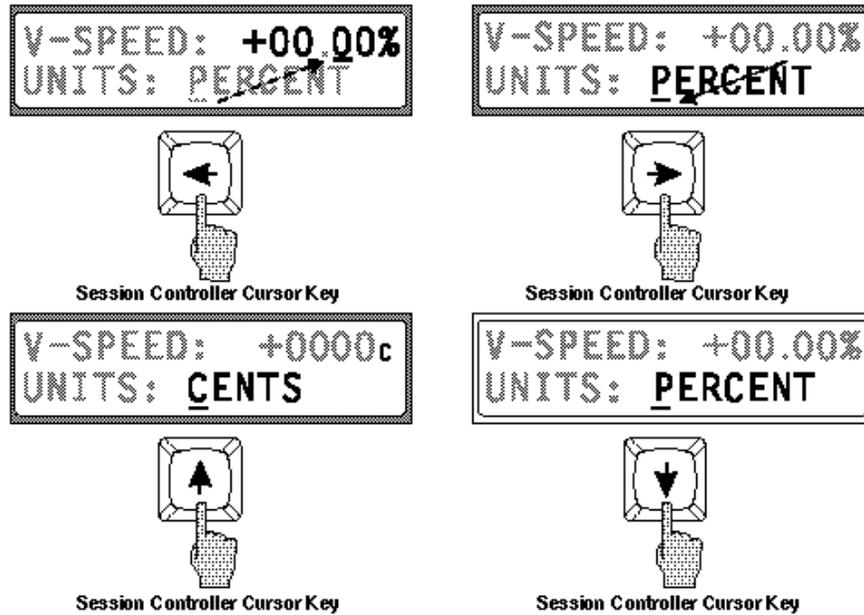
4.2.6 Editing Values in a Dialog Window

-   **Press the cursor UP/DOWN buttons** to raise or lower a numerical value or to cycle through text options in the field above the cursor.

-   **Press ENTER** to accept the value you have chosen and proceed to the next dialog window.

4.3 A TOUR OF THE SYSTEM MENU...

This "tour" goes through each menu item, and provides a brief description. If the item is described elsewhere in the manual, a paragraph reference is provided.

4.3.1 System Information

Select this item to display system information about RADAR II. *This information could be useful for Otari Technical Support personnel when troubleshooting system problems!* Using the Cursor Arrow keys, you may scroll up/down to

4.3.2 Show Disk Space

This function provides a means of checking recording time available via the SYSTEM menu. When you select this item, the system will respond with:
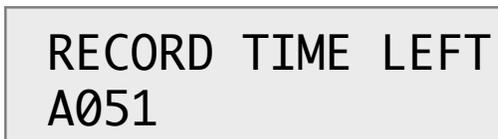
```
RECORD TIME LEFT
A051
```

Press the MENU/PREV button to exit from this display.

Please Note: You may always check the available recording time using the cursor buttons - simply hold the left and right arrows simultaneously to display the available recording time.

4.3.3 Digital I/O

This menu item allows you to select the active Digital I/O parameters - including patched RADAR II track and format.

Complete Digital I/O instructions are provided in §3.17.

4.3.4 Disk Configuration Menu

This item establishes RADAR II's disk configuration, which can vary widely among systems depending on the specific hardware configuration and tasks at hand. Disk Mode provides a means of customizing disk usage and behavior.

Disk Configuration menu item provides these selections:

4.3.4.1 Disk Mode

Disk Mode enables you to customize how RADAR II will utilize the disk(s) on its SCSI chain for track assignment, etc.

The standard RADAR II system has one disk drive, used for recording all 24 tracks. However, up to six additional disks may be added to the system, greatly expanding recording time. For special purposes, you can use Disk Mode to change the track allocation on these drives, so it better suits the current project(s).

Select Disk Mode from the Disk Configure Menu, to display the following choices:

CUSTOM: Selects Custom disk mode, which enables you to specify a different tracks per disk setting, and grouping for the disks. Custom Mode enables configurations such as 24 tracks on six removable magneto-optical (MO) disks - running four disks per track. *This menu item simply selects Custom Mode. Please see Custom Settings, in §4.3.4.2 for additional (required) setup.*

MONDO-24:

MONDO-8 (RADAR I): Mondo-8 reconfigures RADAR II's disks so that all disks are used for just tracks 1 through 8. This mode maintains compatibility with earlierRADAR hardware and its MONDO-8 mode, which enabled the three-disk RADAR I to record eight tracks (instead of 24) across the disks, greatly increasing contiguous recording space. *MONDO-8 mode is provided in RADAR II for situations requireing swapping drives between newer and earlier systems.*

INT+EXT (RDR I) The system uses both internal (0,1,2) and external (3, 4, 5) disks for recording. *This mode is maintained for compatibility with earler RADAR hardware.*

EXTERNAL (RDR I): The system uses external SCSI disks (ID 3, 4, 5); as installed in EDB-3. *This mode is maintained for compatibility with earler RADAR hardware.*

After changing configurations, you must create a new (blank) project before operating, since projects do not support mixed modes. *Additional information about disk configuration appears in Appendix B, Maintenance.*

4.3.4.2 Custom SCSI Configurations

The Custom disk configuration mode supports non-standard SCSI configurations. Custom settings are available under the Disk Configuration/Disk Mode menu.

To properly set up Custom mode, you must specify

- **Tracks per disk**
- **Cluster Size**
- **Track Grouping**

<u>Tracks per Disk:</u> This setting specifies the number of tracks recorded per disk; with a range from 1 to 24.

<u>Cluster Size:</u> This item selects the desired disk data cluster - either 32 KB or 64 KB. Typically, 64 KB is suitable for most/all hard disk drives, while 32 KB cluster size is more appropriate for slower devices, such as MO drives. Please consult the drive manufacturer or Otari Corporation for guidelines.

<u>Track Grouping:</u> The Grouping preference enables you to specify which SCSI devices are assigned to which tracks.

The Track Grouping configurations use letters (ABCDEF) for each disk drive (up to six disk drives total) and assigns letters to SCSI ID's 0,1,2,3,4,5 and 6.

```
                                          SCSI ID
Mode             Tracks per Disk      0 1 2 3 4 5 6

INT                    24             A A A A A A X
EXT                     8             X X X A B C X
INT+EXT                12             A A A B B B X
MONDO-24
Six MO Drives           4             A B C D E F X
```

Here is an example of how to set the "Tracks per Disk" and "Track Grouping" for a setup using six MO drives, each capable of recording on four tracks per disk:

In this example, you would set Tracks Per Disk" to 4, then map the SCSI IDs so that six disks are used.

4.3.5 RADARLink Enable/Disable

Please Note: RADARLINK is described in Appendix D of this manual.

This menu item is provided to enable RADARLINK operation, permitting multiple slaved RADAR II systems to be controlled from one location. Upon selecting this item, the menu will prompt you with:

If you select YES, the system will prompt you with:

The FIRST RADAR II system you place into RADARLINK mode will appear as Master; others will use their ID's as selected in the Preferences Menu (§4.3.4.14).

To disable RADARLINK re-select the RADARLINK item, and select Cancel.

4.3.6 RADARLINK SOLO Mode Selection

This menu provides the ability to place an individual RADAR II system into "solo" mode, which enables the Master controller to control just that system. If selected, the system will respond with:

Use the cursor up/down keys or the RE-8's jog wheel to scroll through the available RADARLINKed systems; press ENTER to select the desired system to SOLO.

To exit from this mode, re-selct the RADARLINK SOLO item to disable it.

4.3.7 Machine Control

This menu item enables/disables Machine Control SLAVE mode, in which an external machine (that conforms to the SONY 9-pin serial machine control specification) can control a slaved RADAR II system. While under Machine Control, RADAR II's Play, Rewind, Fast Forward, Record, and Locate functions cen be performed via remote commands, as if it were a Sony BVU-950 machine.

During SLAVE mode, tracks can be armed/disarmed manually on RADAR II. In addition, RADAR II will respond to external track arm commands which adhere to the Sony P2 extension.

Machine Control Hookup

To allow RADAR II to be controlled via machine control, connect a DB-9 cable (straight pin-to-pin wiring) from your machine control device to the BOTTOM DB-9 connector on the MF-3 card (the same card used for RADARLINK).

Enabling Machine Control

To enable Machine Control, select the appropriate item from the SYSTEM menu. RADAR II responds with:

When Machine Control is enabled, the system display shows a flashing "S" in the upper-right corner:

To disable Machine Control operation, re-select the Machine Control item from the System menu.

4.3.8 Machine Control RS-422 Device ID Selection

RADR II offers four choices for the device ID, which is transmitted over the RS422 link when requested by the controlling Sony 9-pin `DEVICE_TYPE` command.

The selections are: **BVU-950** (default), **APR-24**, **DTR-90**, or **RADAR**.

Please Note: This setting only affects response to the `DEVICE_TYPE` command.
RADAR II supports the same commands, regardless of the device ID setting.

4.3.9 Set Time & Date

This menu item enables you to set the time and date on RADAR II's internal clock. This date/time information is used for time stamping backup tapes, etc. Upon selecting this menu item, the system will respond with:

```
DATE:1998-Apr-06
TIME:    19:14:53
```

Use the cursor up/down keys to change the value of each field; use the cursor left/right keys to move between fields and between lines. (You may also use the jog wheel to increase/decrease field values.) When completed, press the ENTER key.

4.3.10 Upgrade System

This item enters a mode which saves the current system state, then prepares the system for shutdown prior to installing factory-supplied software updates from disk.

Complete instructions for this menu item appear in Appendix A.

4.4 PROJECT MENU

The Project Menu contains the following submenus, defined below:

4.4.1 Backup Menu/Restore Menu

These items enter RADAR II's Backup & Restore modes, as described in Section 8 of this manual.

4.4.2 GOTO Project

This item enables changing the currently active Project:

Go To Project is described in §2.10.3.

4.4.3 Create Project

This item is used to create a new RADAR II Project:

Create Project is described in §2.10.2

4.4.4 Name Project

This item is used to re-name a RADAR II Project, and is described in §2.10.4

4.4.5 Copy Project

This item is used to COPY (or duplicate) an <u>entire</u> RADAR II Project into a new Project number.

This feature is described in §2.10.5.

4.4.6 Delete Project

This item deletes the current RADAR II Project, and is described in §2.10.8.

4.4.7 Renumber Project

This item renumbers the current RADAR II Project, and is described in §2.10.8.

4.4.8 Sample Rate

This item sets the Project Sampling Rate to one of RADAR II's standard rates. This item is described in §2.10.7, and in Section 3.

4.4.9 Audio Format (16-Bit/24-Bit Recording Selection)

This item selects between Audio Formats - either 16-bit (compatible with standard & earlier digital audio equipment, including RADAR I), or 24-bit (providing the maximum headroom/noise floor available with RADAR II's digital audio converters).

Please Note: RADAR II supports recording either in 16-bit (default) or 24-bit audio formats.   Recording format is specified on a project basis - once a project is started in one format, it cannot be converted to the other.

4.4.9.1 Audio Format Overview

RADAR II can record projects using either 16-bit or true 24-bit audio format.

24-bit audio provides the ultimate quality in digital audio - however, 24-bit projects uses up disk space faster, take longer to back up and restore, and may not be compatible with earlier hardware/software products.

16-bit projects offer excellent audio quality, use less disk space, back up and restore faster, and maintain compatibility with earlier hardware and software that may not support 24-bit audio. (16-bit RADAR II projects may be backed up onto tape, and restored onto RADAR I systems. However, 24-bit projects cannot be transferred to earlier RADAR systems.)

RADAR II may have both 16-bit and 24-bit projects on the same hard disk(s) simultaneously - however the projects cannot share audio files.

Please Note: You must make this selection before starting a new project. After the project is started in one format, it cannot be changed to the other.

- **To select/change the default Audio Format, select the DEF AUDIO FORMAT item from the Preferences menu.**

4.4.9.2 Changing RADAR II's Default Audio Format

1. **Press the MENU/PREV button.**

2. **Scroll UP/DOWN through the choices until the PREFERENCES menu item is displayed.**

```
MAIN MENU:
 PREFERENCES MENU
```

3. **Press ENTER.**

4. **Scroll through the submenus until the Default Audio Format item is displayed:**

```
MAIN/PREFS MENU
 DEF AUDIO FORMAT
```

5.. **Press ENTER.** The system will respond with:

```
DEF AUDIO FORMAT
   16-BIT PCM
```

6.   **Use the cursor up/down keys (or the Jog wheel) to select the desired default Audio Format for the project.**   The available choices are 16-Bit PCM (default) and 24-Bit PCM.

7.   **When you have selected the desired Audio Format, press ENTER.**   This will automatically accept the selection and escape from the menu.

Please Note: Default Audio Format setting is retained by the current project, and will be recalled on the next power up.

4.4.10 TC Format

This menu item sets the project's Time Code format:
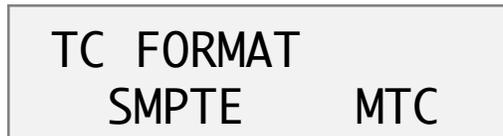
```
 TC FORMAT
    SMPTE      MTC
```

Select the desired format using the cursor keys, then press ENTER. The TC Format setting will be maintained until changed.

4.4.11 TC Rate

This menu item sets the project's Time Code rate:

```
 TC RATE:
    30ND      30DF
```

24   25   29.97ND   29.97DF

<<<---   Cursor Keys select   --->>>

All Time Code rates are available - use the left/right cursor keys to select between 24 fps, 25fps, 30ND (non-drop frame), Select the desired format using the cursor keys, then press ENTER. The TC Format setting will be maintained until changed.

4.4.12 Start Time

Start Time enables you to set a default start time for a Project; this time is used as Locate point 0, and the project is automatically located to this point upon opening.

4.4.13 Sync Offset

Sync Offset allows the operator to enter a fixed offset between incoming time code and displayed time code; this can compensate for the lag induced between the video head and address track head on a VTR, can correct a difference between screen burn-in and the actual time code stripe on a video tape, etc.

This feature is described in Section 5.

4.4.14 SMPTE Lock Speed

This item allows you to select the behavior of RADAR II's SMPTE time code lock. A setting of Fast allows for fast, accurate tracking of the incoming SMPTE time code. A setting of Slow allows for smoother tracking, especially of jittery time code sources - this is at the expense of longer time code lock time.

If you are recording audio from a source such as a VTR or other tape-based machine which has been striped with SMPTE timecode from an unstable clock source (or a timecode source converted from MIDI to SMPTE), you may, upon playback, encounter audio which "warbles". To correct this problem, select the SLOW setting under this item, and transfer the audio again. *We recommend that any time you stripe SMPTE on a tape-bsed transport, you make sure that you reference the SMPTE generator being used for the stripe with a stable clock such as Video.*

Make your selection using the cursor left/right keys, then press ENTER.

4.4.15 Freewheel Time

This item enables you to select how many frames of bad or missing SMPTE time code RADAR II will tolerate and remain in Chase Lock mode. RADAR II supports a freewheel range between 0 and 10 frames; we recommend a setting of 1 to 2 frames for most applications. When you select this item, the system will respond with:

4.4.16 Display Mode

This menu item enables you to select the time display mode used by RADAR II's display. Three selections are available:

- **SMPTE (hh:mm:ss:ff.th)**
- **Feet/Frames**
- **Bars/Beats**

Make your selection with the cursor keys or RE-8 jog wheel, and press ENTER. *This setting is retained thereafter until you change it again.*

4.4.17 MIDI Tempo Map

RADAR II provides a MIDI Tempo Map, which enables you to specify beats per minute and beats per measure.   To set/change the MIDI tempo map, select this item. The system will respond with the following:

Use the cursor LEFT key to move to the Beats per Minute (BPM) field; enter the desired value using the numeric keypad or the jog wheel. Cursor RIGHT to the Beats per Measure field(s); enter the desired time signature, then press ENTER.

Starting Time: Bar 1 Beat 1 of the project will begin at the projects START TIME, which is always specified as a SMPTE number.

Please note: At press time RADAR II supported only one tempo for the entire project.

4.4.18 Name Track

RADAR II enables you to not only name Projects, but to name tracks within the project. To do so, select the Name Tracks menu item. The system responds with:

Select the desired track using either the Jog Wheel or the Track Arm buttons. Then, cursor down to the second LDC menu row, and enter a track name:

Press ENTER to accept the track name you've entered, then select other track(s): repeat as needed. *You may edit track names using the same methods.*

4.4.19 Reclaim Space

This item reclaims unused audio from deleted projects, and is described in §2.6.9.

4.4.20 Renumber Locates

Renumber Locates allows the operator to renumber locate points from the beginning of a project (in time code order), starting from 1.

4.4.21 Erase All Disks

This item erases ALL audio and all projects from RADAR II. Use this item if you have backed up your disks and want to return to a "fresh" system with the full amount of recording time.

Please Note: As this operation is not recoverable, be very sure you have all important data backed up before proceeding.

Before RADAR II erases all disks, there several warnings, as shown:

And *(finally...):*

4.5 EDIT MENU

The Edit Menu contains items as shown. These items are described below:

4.5.1 Undo/Redo

This item undoes/redoes the previous RADAR II operation or edit. Please note that there are several functions, such as Erase All Disks, that cannot be recovered using UNDO!

4.5.2 Modify Edit

This item may be used to modify the parameters (IN time, OUT time, paste point, etc.) of the previous edit. *This feature is described in §7.12.*

4.5.3 Edit Features *(CUT, COPY, PASTE, MOVE, ERASE, LOOP, SLIDE, INSERT, REVERSE)*

These features are described in Section 7, RADAR II Editing Features.

4.5.4 Listen

The Listen function plays the clip currently on RADAR II's clipboard. *This feature is described in §7.2.4.*

4.5.5 Mute Tracks

Mute Tracks is used to temporarily turn off disk tracks that are not in use. Unlike a monitor mute, which only turns off the track monitoring, Mute Tracks actually shuts off the track at the disk drive. This effectively increases the disk drive's available bandwidth.

Mute Tracks is most used for ensuring seamless punch-out monitoring during overdubs. If you perform a punch-in/punch out recording operation, the punch-out will be seamless (i.e. no gap - a smooth switch between input and track monitoring), if the following condition is met:

The punch-out monitoring will be seamless if the number of "free" disk tracks equals or exceeds the number of tracks you are recording on that disk unit.

Thus, if the disk activity exceeds the amount necessary for seamless punch-out (i.e. all 8 disk tracks are in playback, but you need to overdub on just two tracks, you may use Mute Tracks to turn off two other tracks on the disk, freeing the bandwidth to enable the seamless punch-out monitoring.

Complete operating instructions for this feature appear in §7.14.

4.5.6 Import *.WAV Files

This feature enables you to import any valid .WAV sound file from RADAR II's floppy disk drive into the RADAR II Editing Clipboard; from there the sound file may be placed into any RADAR II Project.

This feature is most useful for importing sound file samples directly, without an A/D conversion. Upon import, you may select the converted playback sample rate (which defaults to the current sample rate) and gain for the sound file.

This feature is described in §7.15.

4.5.7 Crossfade Time

This item enables you to set and change the Crossfade time to be used on all edits and record punch-ins. (Crossfade time is specified in milliseconds; the default setting is 5 milliseconds.) Minimum Crossfade Time is 0, maximum is 100 milliseconds.

To set or change Crossfade time, select this item, then use the UP/DOWN buttons on the front panel, or the numeric keys (or jog wheel) on the RE-8, to set the new crossfade time. *This feature is described in §7.2*

4.5.8 Record Safe

Record Safe enables you to globally place RADAR II into SAFE mode, mimicking the function of the SAFE button on the RE-8. If the system is placed into RECORD SAFE, you cannot arm tracks, and the SAFE button is lit on the RE-8. To arm tracks again, you must re-select "RECORD SAFE: OFF:" from the Edit menu, or you must press the SAFE button on the RE-8.

4.6 PREFERENCES MENU

The Preferences Menu contains the following submenus and dialogs. These items are described below.
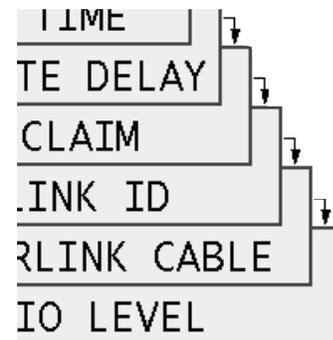
4.6.1 Default SMPTE Field

This item allows you to select on which field the LCD cursor is flashing when a time code number is displayed for editing. (You may always move the cursor after the time code number is displayed – however, having the cursor placed on the most-used field saves keystrokes.)

The available choices are SECONDS or FRAMES. Make your selection using the cursor left/right keys, then press ENTER.

4.6.2 Show Subframes

This item allows you to select whether or not subframes (hundredth frames) will be displayed during normal transport operation.

Please note that subframes are ALWAYS displayed during jog opoerations. Make your selection using the cursor left/right keys, then press ENTER.

4.6.3 Default Sample Rate

This item enables you to set the default Sample Rate of the system. (This Sample Rate may be changed as needed… however this Preference sets the default Sample Rate upon power up.)

To set/change the default Sample Rate, select the menu item. The system will respond with:

Use the cursor up/down keys (or the Jog wheel) to make your selection from the provided choices, then press ENTER.

4.6.4 Default Audio Format (16-Bit PCM/24-Bit PCM)

RADAR II can record projects using either 16-bit or true 24-bit audio format.

24-bit audio provides the ultimate quality in digital audio - however, 24-bit projects uses up disk space faster, take longer to back up and restore, and may not be compatible with earlier hardware/software products.

16-bit projects offer excellent audio quality, use less disk space, back up and restore faster, and maintain compatibility with earlier hardware and software that may not support 24-bit audio. (16-bit RADAR II projects may be backed up onto tape, and restored onto RADAR I systems. However, 24-bit projects cannot be transferred to earlier RADAR systems.)

RADAR II may have both 16-bit and 24-bit projects on the same hard disk(s) simultaneously - however the projects cannot share audio files.

Please Note: You must make this selection before starting a new project. After the project is started in one format, it cannot be changed to the other.

•   **To select/change the default Audio Format, select the DEF AUDIO FORMAT item from the Preferences menu.**

<u>Changing RADAR II's D efault Audio Format:</u>

1.   **Press the MENU/PREV button.**

2.   **Scroll UP/DOWN through the choices until the PREFERENCES menu item is displayed.**

```
MAIN MENU:
PREFERENCES MENU
```

3.   **Press ENTER.**

4.   Scroll through the submenus until the Default Audio Format item is displayed:

```
MAIN/PREFS MENU
DEF AUDIO FORMAT
```

5..   **Press ENTER.**   The system will respond with:

```
┌─────────────────────────────┐
│       DEF AUDIO FORMAT       │
│          24-BIT PCM          │
└─────────────────────────────┘
```

6.   **Use the cursor up/down keys (or the Jog wheel) to select the desired default Audio Format for the project.**   The available choices are 16-Bit PCM (default) and 24-Bit PCM.

7.   **When you have selected the desired Audio Format, press ENTER.**   This will automatically accept the selection and escape from the menu.

Please Note: Default Audio Format setting is retained by the current project, and will be recalled on the next power up.

4.6.5 Default Time Code Format

This feature enables you to select between the system's two linear time code formats, SMPTE or MIDI Time Code (MTC):

```
┌─────────────────────────────┐
│        DEF TC FORMAT         │
│        SMPTE    MTC          │
└─────────────────────────────┘
```

Make your selection using the cursor left/right keys, then press ENTER.

Please Note: Default Time Code Format setting is retained by the current project, and will be recalled on the next power up.

4.6.6 Default Time Code Rate

This menu item sets the system's default Time Code rate:

```
                                    ┌─────────────────────────────┐
                                    │        DEF TC RATE:          │
24   25   29.97ND   29.97DF         │       30ND     30DF          │
                                    └─────────────────────────────┘
```

<<<--- Cursor Keys select --->>>

All Time Code rates are available - use the left/right cursor keys to select between 24 fps, 25fps, 30ND (non-drop frame), Select the desired default format using the cursor keys, then press ENTER.

4.6.7 Default Project Start Time

Start Time enables you to set a default start time for all Projects. This time is used as Locate point 0. Any new project can, of course, be reset to another Start Time using the Start Time feature on the Projects menu (§4.4.12).

```
DEF START TIME:
00:00:00:00
```

4.6.8 Sync Output

This feature enables the wordclock routing feature - if set to Wordclk, the wordclock output comes from RADAR II's internal clock. If set to Echo Thru, the wordclock input is routed to the wordclock output. *These features are further described in Section 5.*

4.6.9 Static SMPTE Out

The SMPTE time code output is generally active, even if the system is not set to chase time code. However, some external synchronization equipment cannot properly handle a stationary (static) time code input. Therefore, this Preference menu item was provided.

To disable static SMPTE out, select this menu item. The system will respond with:

Use the cursor keys (or Jog wheel) to make your selection, then press ENTER.

4.6.10 Track Solo Mode

Track Solo is a playback monitoring feature using the RE-8. Three Track Solo mode settings are available:

Additive: In Additive Solo mode, each time a track solo button is pressed, the track is "added" to any others being soloed

Interlock: In Interlock Solo mode (the system default), every time a Solo button is pressed, the previous soloed track(s) are taken out of Solo.

   If you want to solo more than one track while in Interlock Solo mode, simply press <u>and hold</u> the first track solo button, then select additional tracks to be soloed.

Momentary: In Momentary Solo mode, track(s) are kept in solo for as long as their solo buttons are held.

4.6.11 Low Disk Warning

This item allows you to set a low-disk space alarm, so that if available recording time gets below the specified amount, RADAR II posts a warning on the LCD display.

The default setting for this level is 5 minutes; you may change this as desired between 99 minutes and 0 minutes.

Please Note: To receive <u>NO low disk space warning</u>, set the level to 0 minutes.

4.6.12 Slide Time Units

This menu item enables you to specify the type of units used when the SLIDE edit feature is used.

The choices are FRAMES or MSECS (milliseconds); make your selection with the cursor keys, then press ENTER,

4.6.13 Record Mode

The Record Mode menu item enables you to set two important preferences:

        Record Button Combination
        Punching Additional Tracks Behavior

When the Record Mode menu item is selected, the system will respond with:

Use the cursor left/right buttons to switch between the RECORD and ARM TK fields, and use the cursor up/down buttons within the fields to change the settings.

These submenu dialogs operate as follows:

RECORD *(Record Button Combination)*

The RECORD submenu provides two choices for how RADAR II is placed into record: REC plus PLAY, or REC only. Make your selection as desired, then press ENTER to return to READY mode. (Or, press Cursor Right to change to the ARM TK: field, below.)

ARM TK *(Punching Additional Tracks behavior)*

Use the ARM TK: item to select how RADAR II behaves during a recording when additional tracks are armed for record. Two choices are provided: REC READY and INST REC ("Instant Record").

REC READY, the systems default setting, additional tracks may be <u>armed</u> for record while other tracks are already in record; to begin recording on the newly-armed tracks, you must enter RECORD again.

If, however, INST REC (instant record) is selected, the act of arming an additional track places that track <u>immediately</u> into record, with no additional keystrokes. *Make your selecting using the cursor up/down keys, then press ENTER to return to READY mode, or press Cursor Left to return to the RECORD: submenu.*

4.6.14 Fast Forward/Rewind Rate

Use this item to select the speed of fast-wind when either the FFWD or REW keys are pressed. (The range is from 1x to 99x play speed.) Make your selection using the cursor up/down keys, the numeric keypad, or the jog wheel; then press ENTER.

Please Note: RADAR II provides two fast wind speeds - the standard speed as set on this menu, and a faster speed obtainable when the FF or REW button is pressed twice in a row. The double-press speed is 3x faster than the regular speed.

4.6.15 Peak Hold Time (Input/Playback Metering)

This menu item enables you to set how long RADAR II's meters will hold a peak level indication. This duration is specified in seconds, with a top limit of 999 seconds:

Make your selection using the cursor up/down keys, the numeric keypad, or the jog wheel; press ENTER to return to READY mode.

Please Note: To hold level peaks indefinitely, enter "-1" for this setting. To disable the feature, enter "0".

4.6.16 Clip Hold Time (Input/Playback Metering)

This menu item enables you to set how long RADAR II's meters will display a clip level indication after a digital clip on input or playback. This duration is specified in seconds, with a top limit of 999 seconds.

Make your selection using the cursor up/down keys, the numeric keypad, or the jog wheel; press ENTER to return to READY mode.

Please Note: To hold level clips indefinitely, enter "-1" for this setting. To disable the feature, enter "0".

4.6.17 Save State Delay

This item enables you to specify how long after your last system action RADAR II waits before it performs its periodic "SAVING STATE" operation. This delay is set in seconds, as shown:

Save State Delay is specified in Seconds from 1 to 99. Make your selection using the Numeric keys or Jog wheel, then press ENTER.

Please Note: The Save State feature cannot be shut off indefinitely.

4.6.18 Auto Reclaim

The Auto Reclaim feature enables the system to automatically reclaim space whenever possible, without operator intervention. This feature is enabled/disabled via this item on the Preferences menu:

```
 AUTO RECLAIM
DISABLED ENABLED
```

Please Note: Auto Reclaim is enabled by default.

If Auto Reclaim is disabled, the system retains entire audio files, even if only a small clip is being referenced by playlists. With Auto Reclaim enabled, if you start out with a 10-minute recording and edit or repunch so that only 5 seconds of the original recording is referenced, the system only retains the audible five seconds. The unused 9 minutes and 55 seconds of inaccessible recording space is freed up for further use.

Audio file storage is not trimmed or reclaimed unless the audio is no longer accessible by the current project, the UNDO memory, or the editing clipboard memory. RADAR II automatically tracks which audio files are shared between multiple projects and does NOT automatically trim or delete any shared audio files.

Please Note: The manual Reclaim Space menu item (available on the Project menu) is still required to trim or reclaim any audio space shared by multiple projects.

To change the setting for Auto Reclaim, use the cursor keys, or Jog wheel to select DISABLED or ENABLED, then press ENTER to continue. This value is retained permanently - or until changed again on this menu.

4.6.19 RADARLINK Slave ID

RADARLINK is a built-in feature of the system, enabling up to 5 RADAR II systems to be slaved together for wide-format digital multitrack recording. RADARLINK requires each system to have a unique Slave ID number. To set/change this number, select the menu item. The system will respond with:

The permissible choices for ID range from 1 to 7. Make your selection using the cursor or numeric keys, then press ENTER.   *More information about RADARLINK appears in Appendix D.*

4.6.20 RADARLINK Cable

RADARLINK Cable setting

The system will respond with:

```
TERMINATE LINK
DB9: IN OUT NONE
```

Make your selection using the cursor keys or jog wheel, then press ENTER.   *More information about RADARLINK appears in Appendix D.*

4.6.21 Audio Level

The Audio Level preference setting provides four level settings for the analog inputs, and four level settings for the analog outputs. The selections are:

- **+24 dBu**   - **+22 dBu**   - **+20 dBu**   - **+18 dBu**

These settings refer to scale (or maximum levels). Put another way, these are all +4 dBu operating levels, with +20, +18, +16, and +14 dBu of headroom.

Example: With RADAR II's input operating level set to +22, a tone of 0 VU coming from a +4 dBu console will cause RADAR II's meters to read -18 (dB below full scale).

If the "+24 dBu" input operating level is selected, the RADAR II meter(s) would show -20 (dB below full scale).

To set or change the system's default audio level(s), select the Audio Level item from the Preferences menu, The system will respond with:

```
AUDIO IN: +24dBu
AUDIO OUT:+24dBu
```

Use the cursor right/left keys to select between AUDIO IN and AUDIO OUT; use the cursor up/down keys to select the desired levels.

Please Note: All inputs must share the same level setting, and all outputs must share the same level setting. However, the inputs and outputs can be set differently.

4.7 DIAGNOSTICS MENU

This menu provides a variety of diagnostics for RADAR II, its SCSI bus, SCSI devices, and display diagnostics. The Diagnostics menu hierarchy is shown below.

Please Note: The Diagnostics features on this menu are described in Appendix B, Maintenance. For your convenience, a brief description of each item is provided here.

4.7.1 Scan SCSI Bus

This item scans RADAR II's SCSI bus for SCSI devices, then posts them to the LCD, where you may scroll through them to read device names and SCSI ID numbers.

4.7.2 Mount / Unmount

This item mounts and unmounts RADAR II's file system - this function should only be used under the direction of Otari Technical Support!

4.7.3 Disk Diagnostics (INIT DISK, CHECK DISK, REPAIR DISK)

These menu items are used when diagnosing and repairing SCSI disk problems.

CAUTION!   INIT DISK is destructive to both the audio data on the disk and the file system - therefore it should only be used under direction of Otari Technical Support!

4.7.4 JAZ Protect/Unprotect Controls

RADAR II can use JAZ drive(s) as recording or backup media. Write-protecting JAZ disks requires software control - there is no physical "write protect tab" as on a floppy disk or 8mm tape cartridge.

<u>**To write protect a JAZ disk:**</u>   Select the "JAZ PROTECT" item from the Diagnostics menu. The system responds with:

```
PROTECT JAZ: 05
```

Use the cursor keys, numeric keys, or jog wheel to select the SCSI ID of the JAZ drive containing the disk you are write-protecting, then press ENTER.

<u>**To unprotect a JAZ disk:**</u>   Select the "JAZ UNPROTECT" item from the Diagnostics menu. The system responds with:

```
UN-PROT JAZ: 05
```

Use the cursor keys, numeric keys, or jog wheel to select the SCSI ID of the JAZ drive containing the disk you are write-enabling, then press ENTER.

4.7.5 SCSI Defect Management (Show Defect List/Verify Disk)

This Diagnostics item enables you to view a list of any defects on a SCSI disk. High-performance SCSI drives use an intelligent method of recovering from bad (unreadable/unwriteable) sectors by remapping the bad sectors to spare sectors on a reserved area of the drive.

In many SCSI applications, this remapping process is completely undetectable. However, in the case of RADAR II, drive performance is very important. Therefore, the Diagnostics menu provides several tools for detecting/avoiding performance problems on SCSI disks.

4.7.5.1 Show Defect List

This menu item reports the number of defective/remapped sectors exist on a particular SCSI disk.

<u>**To view the Defect List for a SCSI dr ive:**</u>   Select the "SHOW DEFECT LIST" item from the Diagnostics menu. The system responds with:

```
DEFECT LIST: 01
```

Use the cursor keys, numeric keys, or jog wheel to select the SCSI ID of the drive you wish to view, then press ENTER.

4.7.5.2 Verify Disk

This menu item performs a surface scan of the selected SCSI drive, tests the integrity of every sector, and reports its findings.

Please Note: This process does NOT overwrite any recorded data.

<u>**To Verify SCSI drive(s):**</u>   Select the "VERIFY DISKS" item from the Diagnostics menu. The system responds with:

```
VERIFY DISK
ID:    ALL
```

Use the cursor keys, numeric keys, or jog wheel to select the SCSI ID of the drive you wish to view (0 - 6, or select ALL to verify ALL disks) , then press ENTER.

Important: When a disk with remapped sectors is INITed (see §4.7.3), any cluster that has been re-mapped is PERMANENTLY marked as "bad" and will never be used to record audio. *This prevents RADAR II from accessing areas of the drive with known performance problems.*

4.7.6 Copy Hard Disks

This feature enables you to copy the contents of one up to three drives to up to
another three drives. (A 1GB disk drive takes about 8 - 10 minutes to copy.)

This feature enables you to quickly transfer data from RADAR II's internal disks to
an external disk array like the Otari EDB-3.

4.7.7 Show Free RAM

This menu item displays the amount of free RAM available on RADAR II; this
information may be helpful to Otari Technical Support when troubleshooting.

4.7.8 Check Project

This function checks the current project for playlist errors, and reports if there are
any problems.

4.7.9 Realtime Errors

RADAR II software contains extensive error logging features, including a mode that
records and captures real-time problems for storage on a floppy disk. Information
from this mode may be useful to Otari Technical Support when troubleshooting.

4.7.10 Modem Menu

RADAR II includes remote modem diagnostics, which enables OTARI Technical
Support to dial up a modem connected to your RADAR II, perform diagnostic
procedures, and monitor system performance to isolate problems.

Please Note: The software for Remote Modem Diagnostics is provided standard. However,
you must provide an external modem (either a 14.4Kbps or a 28.8 Kbps).
Modem connection is described in Appendix A, Installation.

Please Note: The Modem Diagnostics are described in Appendix B.

4.7.11 Debug Features (Configure/Show/Save Debug)

These features (Configure Debug, Show Debug, and Save Debug) are for use under
the direction of OTARI Technical Support personnel.

4.7.12 Hardware Interface Tests (Meter/Key/LED Tests)

These Interface Tests check all meter segments, all Session Controller keys, and all
lighted keys on the product. These tests enable you to verify that the system is
operating correctly, in advance of the more challenging display tests outlined in the
next paragraph.

4.7.13 Display Tests

These three "display tests" enable you to verify the system display is operating correctly, and will also enable you to sharpen your editing skills.

4.8 SHUTDOWN RADAR

This item saves the current RADAR II state, and enables safe, trouble-free power-down. After you select this item, the system will prompt you for confirmation via the LCD, then will say:

Please Note: After the Shutdown RADAR item is selected, RADAR II cannot be operated again until the system power is turned off then back on again!

Section 5   External Synchronization Features

This section describes RADAR II's external synchronization features, including SMPTE time code sync, external house sync, and digital word clock sync features.

This section includes the following subsections.

5.1 GENERAL

RADAR II provides powerful external sync features as standard equipment, making RADAR II equally suited for large-format multitrack recording operation, video post production, and video-reference locked digital audio operation.   This section describes the following RADAR II features:

> **SMPTE Time Code Chase Lock/Generator**
> **MIDI Time Code Chase/Generator**
> **Time Code Display Options (SMPTE, Feet/Frames, Bars/Beats)**
> **External Video (House) Sync Operation**
> **External Digital Word clock Operation**
> **SONY 9-pin Machine Control Slave Operation**

5.1.1 Synchronization Overview

Synchronization is the process of making two things happen at the same time. An example in music production would be making a bass drum and bass guitar note happen at the same time. In film/video production work, synchronization is used to ensure that the sound of the car door slam and the visual of the door closing occur at exactly the same time. In our case Sync is used to make sure RADAR II records and plays back perfectly in time with the various video and audio machines used in these environments.

Sync can also be used to expand the number of tracks available for recording. There may be times when you have more instruments than RADAR II has tracks and you want to chain another multitrack machine to RADAR II to augment your tracks. When you physically record tracks in two separate machines, sync makes it appear as though they are located on one large multitrack machine.

The relationship in a synchronized multi-machine setup is that of master and slave. The master machine dictates where the slaves should cue to and play from. The master also provides the ongoing timing information that keeps playback tracks on all synchronized machines together over time.

5.1.2 SMPTE Overview

SMPTE Time code is measured in terms of hours, minutes, seconds, frames (24 to 30 frames per second) and, in the case of RADAR II, subframes which is one hundredth of one frame. There are a number of different frame rates that correspond to motion picture film, black and white video, color video, and the frequency of AC power mains in different parts of the world. RADAR II is capable of synchronizing to all frame rates in use world wide.

SMPTE time code is an audio signal, although the signal encodes an 80 bit digital word containing precise positioning information. This allows the device reading the time code to accurately determine the position of the matching audio or video.

Normally, time code is recorded onto one track of tape or video sources intended to

be used in a master/slave control relationship. When the master source tape is put into play, any machines (slaves) will read the SMPTE signal and "chase" it, meaning they start playback and continue playing in sync with the master source.

5.1.2.1 SMPTE Frame Rates

The frame rates of SMPTE time code used throughout the world are 30 frames per second (fps), 29.97 fps, 25 fps, or 24 fps. In addition, the 30 and 29.97 fps rates also have drop-frame variants to compensate for the slight synchronization delay introduced by the NTSC broadcast television standard. (Detailed information about the various frame rates is beyond the scope of this manual, and appears in any text on time code.)

Generally, 24 fps is used in film applications, 25 fps is used for PAL standard video, and 30 fps is used for audio and some NTSC video.

The 29.97 fps rate corresponds to the actual frame rate of the NTSC color video signal. (When television in North America was monochrome, the frame rate was 30 fps. The introduction of color television required that chrominance be encoded along with the luminance of B&W television. This compromise allowed older, B&W televisions to receive the same signals as the new color sets; however the frame rate was lowered to 29.97 frames per second.

Drop Frame was introduced as a means of compensating for the difference between 29.97 and 30 frames per second over the broadcast day. Over the course of an hour, the difference between the old B&W and new color rates was about 3 seconds and 20 frames; over a day the difference was about a minute and a half.

In the drop frame scheme, two frames are "dropped" every minute (i.e. 00;00;59;29f jumps to 00;01;00;02f, dropping frames 00 and 01). To make the math work out, the "tens" minutes do not drop frames.

In North America, almost all broadcast video uses 29.97/drop frame time code. Since this is not a universal rule, it's _always_ important to check the frame rate before you start - since it is very difficult to change frame rates during a job!

Please Note: RADAR II indicates Drop Frame time code on its displays by inserting semicolons (;) between the numbers, thus 01;00;14;16.14 is a drop-frame time, while 01:00:14:16.14 is a non-drop time.

Please Note: A system-default SMPTE Frame Rate may be specified via the Preferences Menu. See §4.6.

5.1.2.2 Chasing a Variable-Speed Time Code Source

If the master time code is coming from a tape-based machine, its rate may fluctuate as the playback speed increases and decreases due to tape inaccuracies. If the slave device does not respond to these fluctuations, master and slave will eventually become noticeably out of sync.

However, as a true time code slave, RADAR II continually checks the incoming SMPTE code and modulates its internal sample rate accordingly. This ensures that RADAR II stays locked in perfect sync for the duration of the program material.

5.1.2.3 SMPTE Lock Speed

RADAR II's time code features provide a setting for SMPTE lock speed, which allows you to select the behavior of RADAR II's time code lock. A setting of Fast allows for fast chase lock and tracking of the incoming SMPTE time code. A setting of Slow allows for a more accurate time code lock, and smoother tracking, especially of jittery time code sources - at the expense of longer time code lock time. *The SMPTE Lock Speed item is located on the Project menu, and can be set on a per-project basis.*

5.1.2.4 SMPTE Freewheel

SMPTE Freewheel is the setting that describes the number of frames of bad or missing code RADAR II will tolerate and remain in Chase Lock mode. RADAR II supports a freewheel range between 0 and 10 frames; we recommend a setting of 1 to 2 frames for most applications. *Like SMPTE Lock Speed, Freewheel Time is located on the Project menu, and can me set on a per-project basis.*

5.1.3 MIDI Time Code Sync Overview

The MIDI specification includes a time code scheme not unlike SMPTE. Both time code varieties use hours/minutes/seconds/frames; however the SMPTE variant also provides separate even and odd fields for each frame. (Another difference is that MTC is carried on RADAR II's MIDI ports, while SMPTE is carried on the LTC jacks.)

Please Note: RADAR II always outputs MIDI time code (MTC), even when not syncing to the MTC format.

RADAR II provides a useful suite of MIDI features, such as Tempo Map, and bars/beats ratio and display options. These are described later in this section.

5.1.4 Video Reference (House Sync) Overview

In video production/post production facilities, a high-quality, stable video signal must be maintained at all times. Since the stability of a video signal involves accurate timing of sync pulses and vertical blanking intervals, all equipment used in video production houses must be locked to a master, facility-wide clock signal. This

clock signal enables RADAR II to maintain a stable lock to any time code generated in the facility.   And, when using RADAR II in conjunction with high-end video equipment (such as D2 and Digital Betacam), RADAR II's house sync capability enables flawless digital audio transfers while locked to time code.

5.1.5 External Word Clock Overview

RADAR II's digital audio hardware generates a stable <u>digital word clock</u>, used to synchronize digital data transfer over the AES/EBU or S/PDIF ports. Sometimes, it is necessary to use an external word clock, such as the one generated by a digital betacam machine, during digital audio transfers. An example of this is during digital audio "layback" to a video machine - its digital video synchronization (and its own internal digital word clock) has been derived from the house sync source, and to avoid any digital signal delay when transferring audio from RADAR II back to the video deck, it generates a word clock. RADAR II locks to this word clock, and transfers the audio accurately.

5.2 EXTERNAL SYNC CONNECTIONS
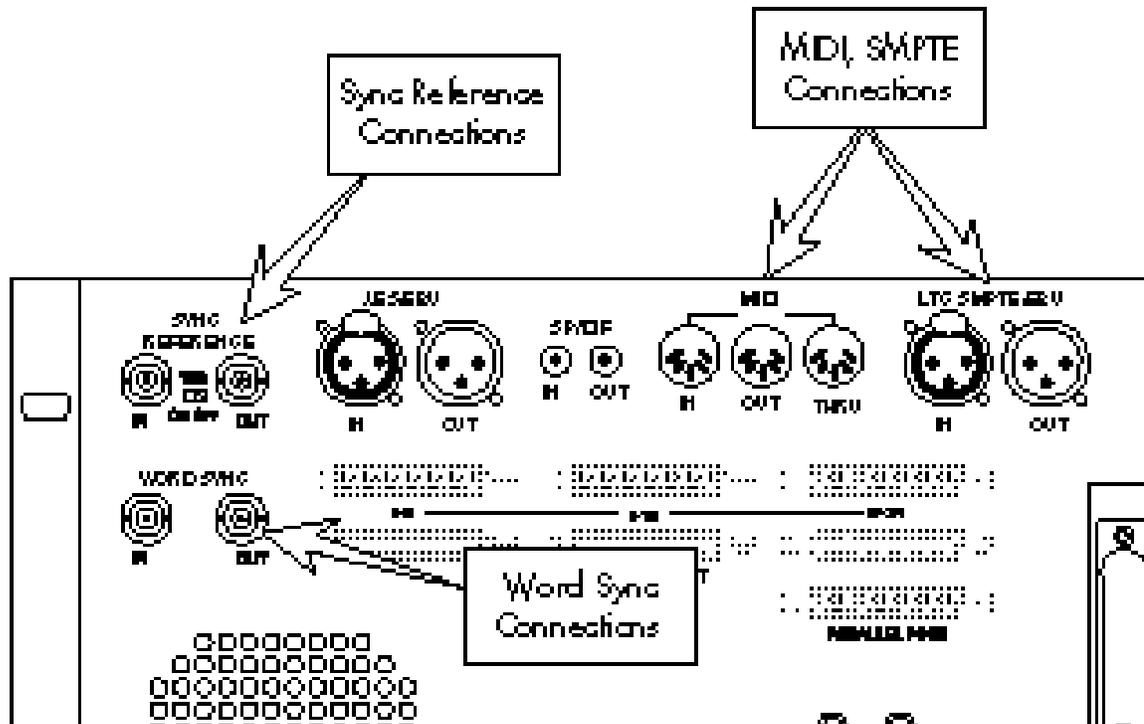
5.2.1 Time Code Connections

5.2.1.1 Time Code Input

RADAR II accepts LTC time code on a, XLR plug. This signal may be balanced or unbalanced. *(Input Level: 100 mV to 2.5 V p-p)*

-          **Connect the time code source to RADAR II's LTC IN jack.**

5.2.1.2 Time Code Generator Output

RADAR II's internal SMPTE generator may be used as a master source for slaving other devices. *(Output Level: 1V p-p balanced., 0.5V p-p unbalanced)*

-          **Connect aXLR plug (balanced or unbalanced) to RADAR II's SMPTE OUT jack.**

The time code generator output is always active, even if the transport is stationary. *A selection on the Preferences menu allows you to enable/disable this SMPTE output when the transport is stationary, since some synchronizers do not support a static time code input. See §4.6.9 for further instructions.*

5.2.2 MIDI Time Code (MTC) Connections

MIDI Time Code (MTC) is a sync protocol used by samplers and MIDI control equipment.

5.2.2.1 MIDI Time Code Input

Connect a standard MIDI cable (5-pin DIN connector) to the MIDI IN port.

5.2.2.2 MIDI Time Code Output

Connect a standard MIDI cable (5-pin DIN connector) to the MIDI OUT port. *The MTC output is active whether or not MTC is the current sync protocol.*

5.2.2.3 MIDI THRU Port

This connector passes through the MIDI input, for use by other MIDI devices in the chain.

5.2.3 Video Sync Connections

If using Video Sync (house sync), connect the sync source to the Sync Reference In BNC connector on RADAR II's rear panel.

The Sync Reference Out connector provides a hard-wired loop through; you may connect this output to other device(s) requiring the same sync source.

Please Note: If the video source requires ground termination, a 75 termination resistor may be inserted using the switch between the Sync Reference connectors. Generally, termination is required if RADAR II is the last device (or only device) in the sync chain, and if there is no downstream device connected to Sync Reference Out.

Do not insert the termination resistor if Loop Through is configured, and any device is connected to Sync Reference Out!

5.2.4 Digital Word Clock Connections

If using RADAR II with an external digital word clock source, connect this source to the WORD SYNC In connector. If a loop-through is required, you may connect the WORD SYNC Out BNC to the device requiring the same digital word clock.

Please refer to the above note regarding termination for digital Word Clock.

5.3 SMPTE/MIDI TIME CODE OPERATION

5.3.1 Setup for Time Code Operation

Before time code operation, you must select the Frame Rate to be used. This setup is available as follows:

<u>**From the Session Controller:**</u>

1.   **Press the SYNC/OFFSET button.** The system will display:
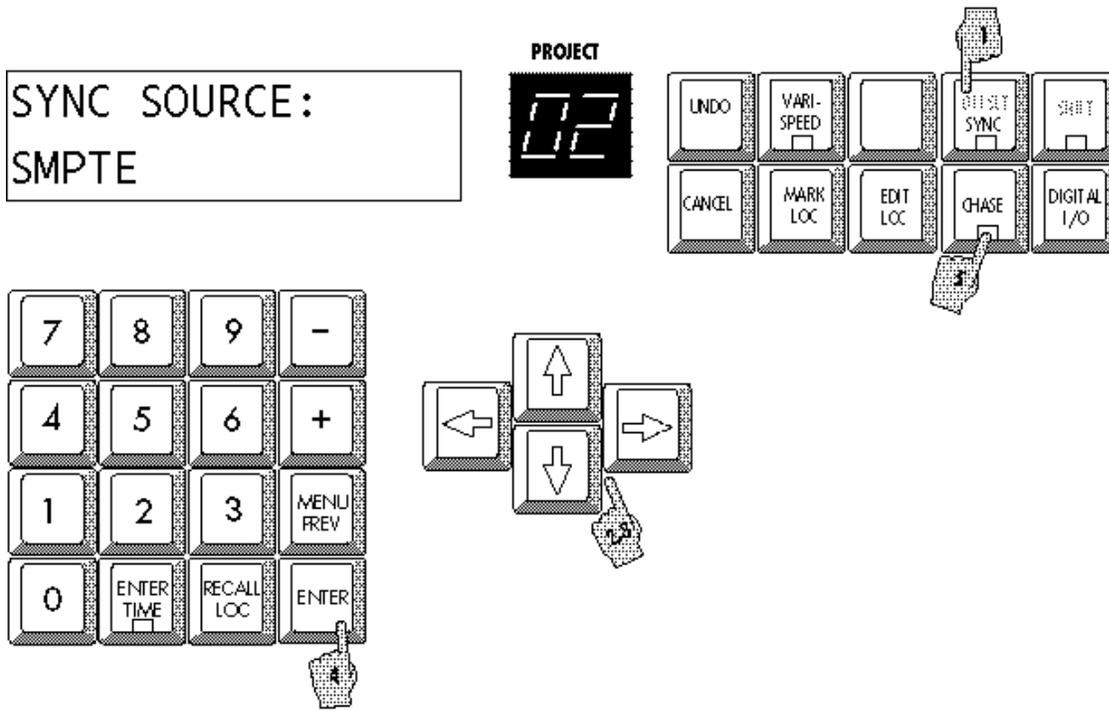
The system will respond with the Sync Source dialog; there are a number of possible selections, as shown below:

2.   **Use the cursor up/down keys to select SMPTE (or MIDI), then press ENTER.** The LCD will then present the Format dialog:

3.   Use the Up/Down buttons (or the Jog wheel) to select a rate from one of the provided options, then press ENTER.

4.   **Press the CHASE button to enable RADAR II to chase lock to incoming time code. Press again to disable.** The CHASE LED will blink indicating that RADAR II is waiting for time code. When time code is received, this LED will glow solid.

Selecting Desired Time Code Display Mode

Through RADAR II's Project menu (§4.4.10), you may select how RADAR II will display time code, with the following selections:

SMPTE	**Shows position as a SMPTE time code display**
Feet & Frames	**Shows position from Start Time in Feet & Frames, 16 frames per foot.**
Bars & Beats	**Shows position from Start Time in bars and beats, using the project's MIDI tempo map.**

5.3.2 Recording while Locked to Time Code

To maintain sync to a time code master on playback, you must record the material while chasing the time code source. To record while chasing time code:

1.   **Press the CHASE button to enable time code chase.**

2.-   **Start the time code source.** RADAR II begins to chase in a second or so.

3.   **Enter RECORD using the Transport keys.** (RECORD to time code functions exactly like standard recording; this is described in §3.5.)

4.   **Press PLAY or STOP to leave record, or stop the time code source.**

5.3.3 Playback to Time Code

Playback to time code requires that you select the time code format (SMPTE or MIDI) and rate (24 - 30 fps). Then, simply supply the time code to RADAR II's SMPTE IN (or MIDI IN) jack; RADAR II cues automatically, and will begin to play locked to the incoming time code.

Transport keys (Fast Forward, Rewind, Play) are locked out and ignored while chasing time code. Punching in/out of record is, of course, permitted. Use the STOP key to disengage chase.

5.3.4 SMPTE Offset

5.3.4.1 Offset Overview

Offset is used when there is audio beginning at one SMPTE location already recorded on RADAR II and audio beginning at another SMPTE time on another machine and they both must play together. RADAR II allows you to vary the offset, that is, the difference in hours, minutes, seconds, frames and subframes between its internal SMPTE time and the sync master. Offset may be edited while both machines are running in sync. Normally, the default offset is 00:00:00:00:00 but this can be changed when necessary. If you already know the exact Offset time, this can be entered directly in the SET dialog.

5.3.4.2 SMPTE Offset Operation

Setting SMPTE Offset From the Session Controller:

1.   **Press SHIFT, release it and then press the SYNC/OFFSET button.** The LCD will present the SET SYNC OFFSET dialog:

2.   **Enter the OFFSET time from right to left starting with frames.** Or, use the Jog Wheel to dial in the desired value(s). *Use the + and - keys to make the offset positive or negative.*

3.   **Press ENTER to return to Ready mode**

5.3.5 MIDI Tempo Map

RADAR II provides a MIDI Tempo Map, which enables you to specify beats per minute and beats per measure.   This function is available on the Project menu, and is described in §4.4.17.

Starting Time: Bar 1 Beat 1 of the project will begin at the projects START TIME, which is always specified as a SMPTE number.

5.4 EXTERNAL SYNC (VIDEO REFERENCE) OPERATION

External Sync Overview

In video production/post production facilities, a high-quality, stable video signal must be maintained throughout the production cycle. Since the stability of a video signal involves accurate timing of sync pulses and vertical blanking intervals, all equipment used in video production houses must be locked to a master, facility-wide clock signal. This clock signal is variously called "Video Reference", "House Sync," "Black Burst," or "RS-170." (While the nature of these signals vary slightly depending on the needs of the facility, the basic function is the same as far as RADAR II is concerned.)

House Sync enables RADAR II to maintain a stable lock to any time code generated in the facility. And, when using RADAR II in conjunction with high-end video equipment (such as D2 and Digital Betacam), RADAR II's house sync capability enables flawless digital audio transfers while locked to time code.

Positional Sync

Video Reference provides RADAR II with a synchronization signal only - and does not contain time code information. Therefore, RADAR II's video reference feature enables you to select the source for "positional" sync– this could be SMPTE time code, MIDI time code (MTC) or RADAR II's internal clock. In the case of SMPTE or MIDI time code, the sync timing comes from the incoming video reference, while the position information comes from the incoming time code.

Video Reference Operation

1. **From the Session Controller, press the Offset/SYNC button.** The system will respond with the SYNC SOURCE dialog described earlier.

2. **Using the cursor up/down keys (or Jog wheel), select VIDEO:**

2. **Press ENTER.** The system will respond with the Video Reference (sync rate) dialog, as shown. This dialog has three choices - NTSC at 59.94 fps, NTSC at 60 fps, or PAL at 50 fps.

3.   **Select the desired video reference sync rate, then press ENTER.** The system will respond with a Positional Source selection:

4.   **Select the desired positional source, then press ENTER.** Remember that Video Reference provides timing information only (i.e. When!), but the positional source provides the place (i.e. Where!)

If you selected INTERNAL, the system returns to READY mode. If you select SMPTE, you must now specify an expected frame rate for the time code. In these cases the system responds with:

5.   **Use the jog wheel or the cursor keys to select the desired Frame Rate, then press ENTER.**

If you select Internal for positional source, the system will use its internal clock. If you select SMPTE, RADAR II uses the incoming time code - if you select MIDI, MTC from the MIDI port is used. In any of these cases, the actual timing is derived from the incoming video sync.

5.6 DIGITAL WORD CLOCK SYNC OPERATION

Wordclock Sync Operation

1. **From the Session Controller, press the Offset/SYNC button.** The system will respond with the SYNC SOURCE dialog described earlier.

2. **Using the cursor up/down keys (or Jog wheel), select WORDCLK:**

2. **Press ENTER.** Wordclock sync is now enabled.

Positional Sync during Workclock Sync Operation

Wordclock Sync, like Video Reference, provides RADAR II with a synchronization signal only - and does not contain time code information. Therefore, RADAR II's Wordclock Sync feature enables you to select the source for "positional" sync– this could be SMPTE time code, MIDI time code (MTC) or RADAR II's internal clock. In the case of SMPTE or MIDI time code, sync timing comes from the incoming wordclock, while the position information comes from the incoming time code.

Section 6   Session Controller Operation

This section describes the features and functions of RADAR's Session Controller, including installation and basic operation.

This section includes the following subsections.

6.1 INTRODUCTION

The RADAR II Session Controller provides remote control of basic housekeeping functions as well as providing the necessary functions and a Jog Wheel for editing audio data. The RE-8 also has input jacks for foot switches to allow hands-free control of selected transport functions.

The Session Controller keys are arranged in groups (as shown on Page 6-3) to make them easier to learn as well as reducing unnecessary hand movements. Session Controller functions are explained in detail below.

6.2 TRACK ARMING FUNCTIONS

6.2.1 Track Arms

The Track Arming keys are used to for several purposes: for arming tracks prior to record, for punching in on additional tracks while recording, and in editing modes, for selecting track(s) to be edited. These switches are momentary type with an LED in the center to indicate active status.

The Session Controller provides 48 Track Arming keys, for use when combining systems via RADARLINK - one Session Controller can seamlessly control up to five RADAR II systems!

6.2.2 Track Function Keys

6.2.2.1 RECord SAFE/CLEAR (§3.5.4)

This function protects against accidental erasure by locking-out the track arming buttons. It can also disarm a group of tracks any time you press the REC SAFE. SHIFT followed by this button will clear all selected tracks.

6.2.2.2 TRACK SOLO (§3.7)

This is used to audition individual or multiple tracks while muting the rest, and is designed to be a more convenient method for solo when editing audio with the RE-8. *(TRACK SOLO is also useful as a stereo-in-place solo function if your mixing desk is not capable of this.)*
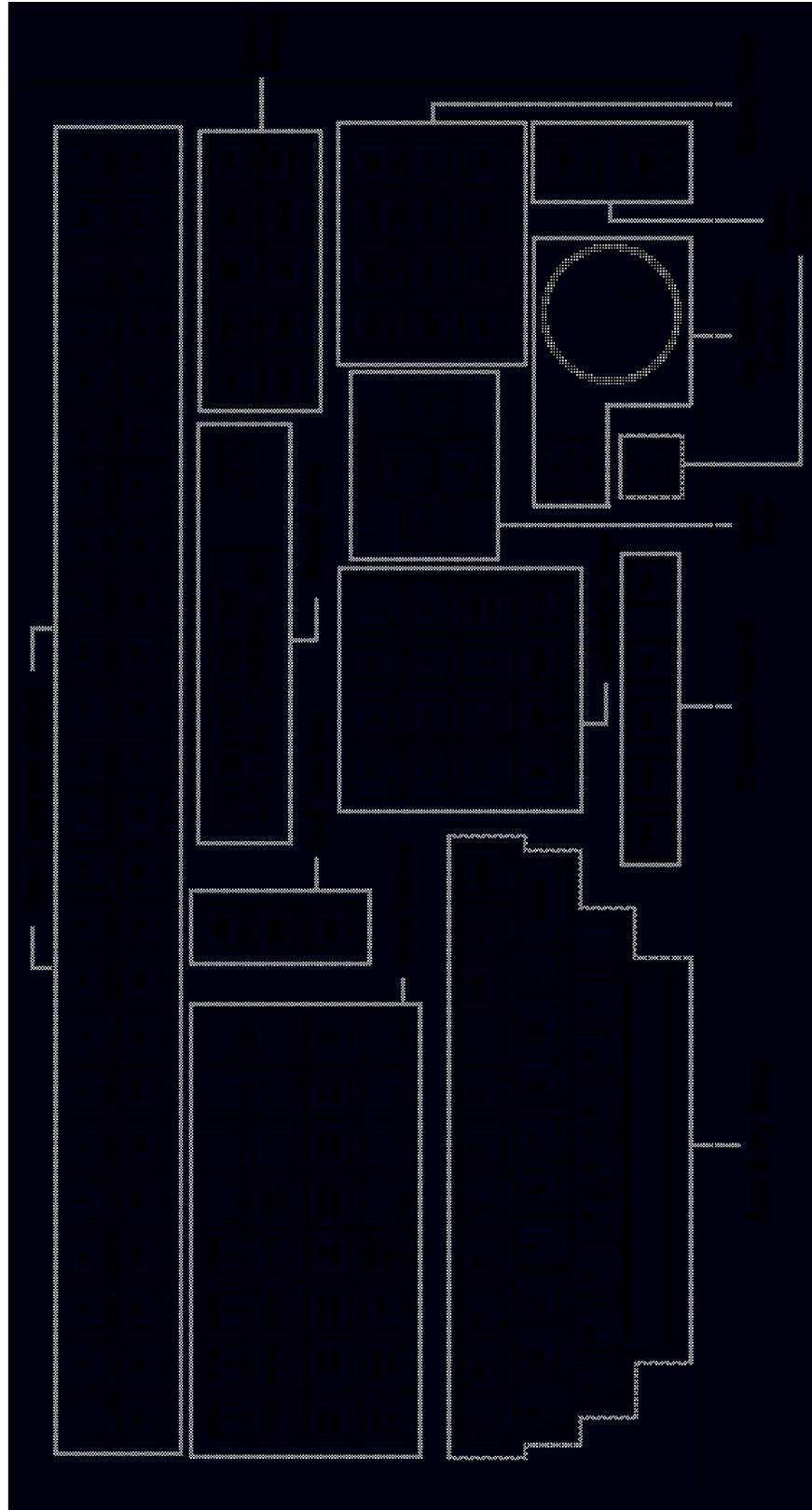
To enable TRACK SOLO:

1.   **Press the TRACK SOLO button.** The button's LED will flash quickly and the LCD will prompt: "Select Tracks To Solo".

2.   **Choose one or several tracks from the Track Arming group.** When selected, the track arming LEDs will blink for each soloed track. You may now perform all transport operations except recording.

Please Note: During playback, the meters will show levels for only those tracks soloed.

To disable TRACK SOLO, press the Track Solo button again. Its LED will go out and you can resume normal operation. The tracks that were previously set in TRACK SOLO are remembered for the next time you engage this function.

Track Solo Modes: Three Track Solo Modes (Additive, Interlock, and Momentary) are available, as described in §3.7. The active Solo Mode may be selected on the Preferences menu.

6.2.2.3 AUTO INPUT (§3.9)

The Auto Input key is used to select if existing program material on rec-readied tracks is monitored during playback (i.e. prior to punch in). When set to Auto Input, RADAR II monitors existing material on rec-readied tracks before and after a record operation. During record, RADAR II automatically switches to input monitoring, and upon punch out, returns to the existing track material.

6.3 TEXT ENTRY KEYS

The Text Entry area is used as a fast way to enter names for location points and backups. This area provides the alphabet in QWERTY format. For upper-case letters, use the SHIFT key (located at the upper right corner of the Session Controller).

The QWERTY keys may also be used as an alternative way to navigate through menu fields. If you know the name of the desired menu selection, you can type only its first letter in place of using cursor UP/DOWN. The same is true for autolocating. If you have previously named the locate points in your project, you can press RECALL LOC, then type the first letter of the location point's name to recall it

6.4 LCD & NUMERIC DISPLAYS

6.4.1 LCD Display

The main Session Controller display is a large 2 line by 16 character backlit LCD. This display offers feedback on all menu, configuration and editing functions.

6.4.2 2-Digit LED Display

The smaller LED display to the right of the main LCD indicates the currently active RADAR II Project. ***More information about this feature appears in §2.10.***

6.5 CALCULATOR KEYS

While not a true "calculator", this group of Session Controller buttons provides a numeric keypad and dedicated function buttons relating to cueing the transport and navigating through menus.
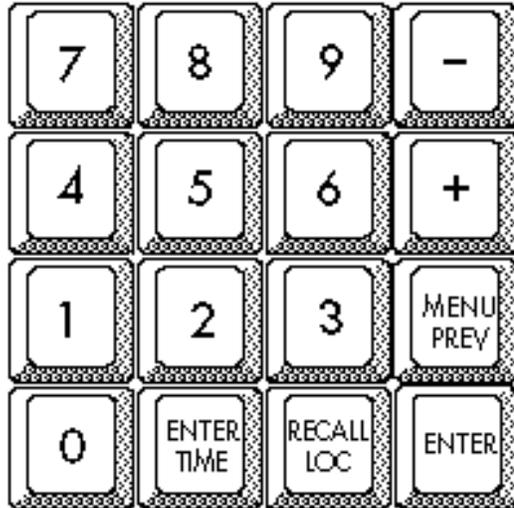
6.5.1 Numeric Keypad

These keys are used for entering numbers into RADAR II menus, and also as a quick way of selecting numbered locate points.

The Numeric keys are also used in conjunction with the PLUS (+), MINUS (–) and ENTER TIME functions to allow direct entry of SMPTE location times.

6.5.2 + (PLUS) and – (MINUS) Keys

When RADAR II is in Ready Mode, the + and – keys enter an additive SMPTE cueing function, where you may enter the number of SMPTE frames you would like to nudge the current location ahead or behind in time.

If you are in a dialog screen, and the LCD is prompting you to enter a number, you may type either key before entering the number.

1. **Press the + (PLUS) or - (MINUS) key from Ready Mode**. The LCD will present a dialog screen showing the current SMPTE time on the top line and 00:00:00:00.00 time on the lower line.

2. **Type in a number representing how many frames you would like to add or subtract to the current time, then press ENTER.** The number you have just ENTERed will be automatically summed with the current time, the transport will be cued to the new time and you will be returned to Ready Mode.

Please Note: The entered number of frames must be less than the current frame rate (e.g. if RADAR II is set to 30 frames per second, and you enter "+31", the system will respond with: "INVALID SMPTE, PRESS ANY BUTTON" If you make a mistake, simply press either the + or – button again and re-enter the number.

Entering Numbers into Other Fields: Use the cursor left/right keys to move the cursor to a different field of the time code display to enter into the field. The default field for direct entry is frames, but you may change this default to seconds in the PREFERENCES submenu. See the description later in this section under the **"Changing the Default Field in the Preferences Submenu"** item for how to change this default field value.

6.5.3 MENU/PREV Key

Press the **MENU PREV**ious button to enter and exit the Main MENU. This helps you navigate the MENU system because it allows you to back-step through any submenus or dialogs you may have mistakenly ENTERed into. If you changed something in one of the dialogs and then you press the PREV button,it will return to its original value

6.5.4 ENTER Key

This button is used to select or execute menu items, to respond to YES/NO queries from the LCD, and to initiate edit operations.

6.5.5 RECALL LOC Key

This key is used to recall locate points, as described in Section 3: Recording & Transport Operation.

6.5.6 ENTER TIME Key

This function allows you to cue the transport to an exact SMPTE location by typing it in directly on the numeric keypad.

Cueing Directly to a SMPTE Location with ENTER TIME

1. **Press the ENTER TIME button.** (This function is available during any transport mode except Record.) The LCD will change to show the captured SMPTE time on the bottom line and the current time on the top line. If the transport is stopped, these numbers will be the same. In PLAY, the number on the top line will continue to increment. The cursor will be flashing beneath the frames or seconds field of the captured time.

2. **Enter the SMPTE time you want starting with frames, then seconds and finally minutes and hours.** (You may also use the cursor keys to move the cursor among different fields, so you may enter times directly.)

3. **Press ENTER to accept the new SMPTE location**. RADAR II will cue to the new location and return to Ready Mode.

Please Note: You may change the default SMPTE field (i.e. the flashing cursor rests on the Seconds field rather than the Frames field) on the Preferences menu, as described in §4.6.

6.6 TRANSPORT KEYS

The Transport keys on the Session Controller are described in Section 3: Recording & Transport Operation.

6.7 CURSOR KEYS

The cursor keys on the Session Controller have several functions, depending on the particular menu you are operating within. For example, the UP/DOWN keys could scroll through menu selections or increase and decrease the number underscored by the flashing cursor. The Left/Right keys generally advance the cursor to the next editable field within a single menu window.

Please Note: For more information on navigating the Menu, see Section 4: RADAR II Menu Operation.

Cursor Key Audition: You may use Cursor Left to audition audio up to the current Mark In time (using the Preroll time setting); conversely, you may press Cursor Right to play after the Mark Out point the amount of the Preroll time. And, if you press Cursor Down, the system will play the audio between the Mark points.

Determining Disk Space Remaining Using Cursor Keys. The Left/Right arrow buttons have another extremely useful function - that is to show, in track minutes, the amount of disk space remaining. *The behavior of this function changes depending on the system's SCSI drive configurations, described in §4.3.*

1.   **Arm the tracks you wish to record upon**. (You may bypass this part of the procedure if you only need to know the total recording time remaining for one track.)

2.   **Press and hold the Left and Right arrow buttons simultaneously**. The LCD will show the available disk space (in minutes) on the tracks you have armed.   The letter(s) represent a block of tracks - in a standard one-disk RADAR, only Drive 0's disk space is displayed (i.e. "A 227"). The number next to the letters represents the time in minutes that you can record given the number of tracks armed. *If tracks are armed for a particular disk, the time left number for that disk will flash on and off.*

The display is in actual recording minutes available - if you have 20 minutes of track time available on Disk 1, and no tracks armed, it shows 20 minutes. If, however, you have two tracks armed for recording, it will show 10 minutes (i.e. 10 minutes per track x 2 tracks = 20 minutes). If you change the number of armed tracks, the remaining time number(s) will change accordingly

Please Note: You may check Disk Space Available at any time - even during recording.
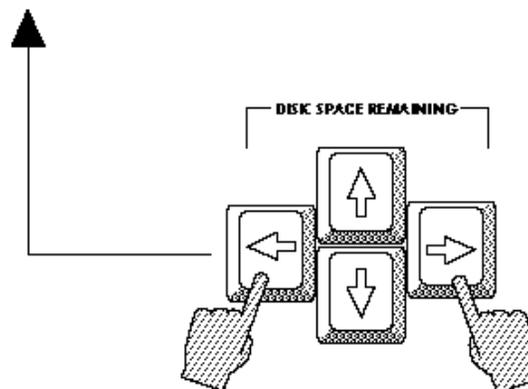
6.8 UTILITY KEYS

This group of buttons contains functions that are broken out from within the RADAR II menu system. Most have been described elsewhere in this manual; cross references to the appropriate manual sections are provided.

UNDO: See either §3.11 (Recording), or §7.2 (Editing)
DIGITAL I/O: See § 3.17
CANCEL: CANCELs or EXITs from current operation
SHIFT: Selects 2nd (blue) functions on Session Controller.
VARISPEED: See §3.8
MARK LOC: See §3.13
EDIT LOC: See §3.13
CHASE: See §5.3
SYNC/OFFSET: See §5.4

6.9 SESSION CONTROLLER DEDICATED EDITING KEYS

This area represents many RADAR II editing features with dedicated keys:
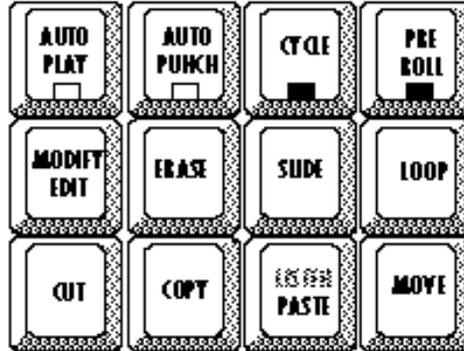
These features are described elsewhere in this manual; cross references appear here:

AUTO PLAY: See §3.13.4
AUTO PUNCH: See §3.10
CYCLE: See §3.15
PRE ROLL: See §3.16
EDIT function keys: See Section 7.

6.10 SYSTEM FUNCTION KEYS

This area represents many project-level and system-level functions, and are described below:
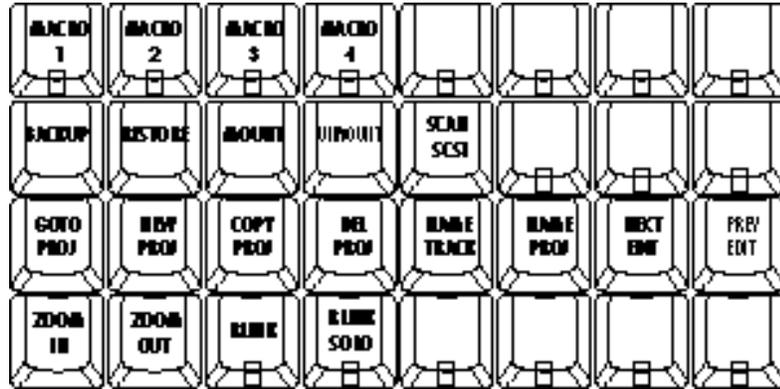
6.10.1 Macro Keys

Macro keys provide a means of storing a series of keystrokes, which will then be executed when the Macro key is pressed. RADAR II provides eight Macro keys. which, when combined with the SHIFT key, can provide up to 16 different key sequences!

TBD

6.10.2 Backup/Restore Keys

These keys provide a quick access method to RADAR II's Backup or Restore menu items and functions. These functions are described in Section 4 (§4.4.1) and in Section 8.

6.10.3 Disk Function Keys (Mount/Unmount/Scan SCSI)

These keys provide a quick access method to RADAR II's Disk Function keys - enabling you to mount/unmount removable disks and perform basic housekeeping funtions directly from the Session Controller.

These functions are described in more detail in Section 4, §4.7.2, and in Appendix B, Diagnostics.

6.10.4 Project Functions

These keys provide quick access to the Project menu items of the same name(s). *These features are described in Section 4, §4.4.*

6.10.5 Edit Locators

TBD

6.10.6 RADARVIEW Zoom Keys

RADARVIEW is a graphical display interface for keeping track of edits, track meter values, sync settings, edit parameters, etc. RADARVIEW *is described fully in §2.12.*

The Zoom Keys access the RADARVIEW Track Window Zoom. The track window provides 14 zoom levels, allowing the screen to zoom from a bit over 4 seconds out to a 24-hour day.

6.10.7 RADARLINK Function Keys

These keys provide keyboard access to the RADARLink functions available on the Projects menu (Section 4, §4.4).

6.11 JOG/SHUTTLE WHEEL

RADAR II's Jog/Shuttle modes provide fast, precise location in recorded material. Shuttle Mode uses the Jog Wheel to vary the speed and direction of audio for locating points; Jog Mode allows you to "scrub" the audio to find exact locations.

Please Note: The Jog Wheel may also be used as a convenient control device when scrolling through RADAR II's menus. When used as an input device, turning the wheel to the right increases the value on screen, and turning it to the left decreases the value.

6.11.1 Entering Jog Mode

RADAR II's Jog/Shuttle modes provide fast, precise location in recorded material. Shuttle Mode uses the Jog Wheel to vary the speed and direction of audio for locating points; Jog Mode allows you to "scrub" the audio to find exact locations.

Please Note: The Jog Wheel may also be used as a convenient input device when prompted by the LCD to enter a numeric value, and also as a means of scrolling through RADAR II's menus. When used as an input device, turning the wheel to the right increases the value, and turning it to the left decreases the value.

Press the Jog/Shuttle button to the left of the wheel to engage JOG mode:
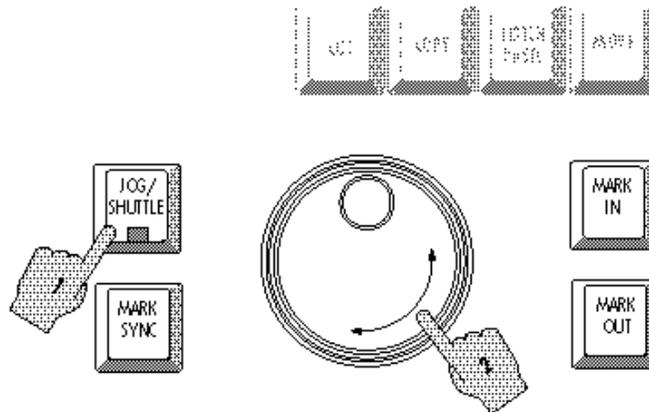
Turning the wheel clockwise or counterclockwise produces variable speed playback for as long as you continue turning it. When you stop turning the wheel, playback will stop. The speed of playback varies from scrub where you can accurately locate the first transient of an audio waveform by rocking the wheel gently forward and backward to slightly above normal playback speed.

Jog "Bump": You may "bump" the current location while in JOG by pressing the cursor left or right buttons. Each cursor press will nudge the jog location by the smallest possible wheel increment.

To exit Jog mode, press any button (including the Jog/Shuttle button.)

6.11.2 Entering Shuttle Mode
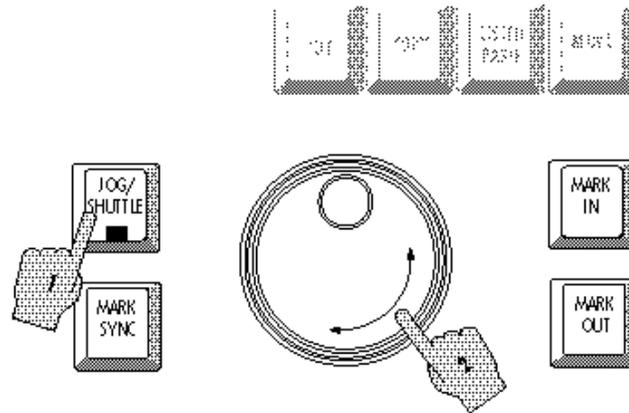
Press the Jog/Shuttle button TWICE to engage Shuttle mode:

Shuttle produces playback at variable speeds like Jog with one difference; when you stop turning the wheel, playback continues at the current speed until you move the wheel again or press a Transport button.

To exit Shuttle mode, press any button including the Jog/Shuttle button.

6.12 MARK IN/OUT/SYNC KEYS

The Mark In, Mark Out, and Mark Sync keys set *temporary* location markers for audio editing and transport locating. Mark In defines the beginning of a clip and Mark Out defines the end point. Mark Sync places a mark at the specific point of interest in a clip - for use when syncing the clip to an event.

Audio between the points can be placed on the clipboard, deleted or erased. *(You may use the Cursor keys to audition the audio between and around the Mark points! See §6.2.7 for details.)*

The MARK IN and OUT points are not only used for editing, but are also useful as Auto Location points that you do not want to store permanently. MARK IN and OUT points can be recalled in the same way as location points.

6.12.1 Defining a Location using MARK IN

1.   **Cue to a desired location using the Transport, Auto locate, Wheel or SMPTE Time Entry functions.**

2.   **Press MARK IN.** This can be pressed during playback, record or with the transport stopped.

During playback or recording, repeated pressing of a MARK key will continuously update that point to reflect the new location and delete the previous one.

6.12.2 Defining a Location using MARK OUT

1.   **Cue to a desired location using the Transport, Auto locate, Jog Wheel or Enter Time functions.**

2.   **Press MARK OUT during any transport mode.** This can be pressed during playback, record or with the transport stopped.

If you will be using MARK OUT to define =the end point of an audio clip, this point must be after MARK IN. *This is not necessary if you are using MARK OUT as a temporary location point.*

During playback or recording, repeated pressing of a MARK key will continuously update that point to reflect the new location, and will delete the previous MARK.

6.12.3 Defining a Location using MARK SYNC

In addition to the In and Out points, RADAR II supports a Mark Sync feature, which is extremely useful in video post applications and any time when you need to edit based on an event during a piece of clipboard audio, etc. For example, if the production calls for a recorded clip of a car crash, you would mark the IN point as the beginning of the tire screech, and the OUT point at the end of the crash.

However, to most accurately spot this effect to video, you can mark a "SYNC" point - in this example you'd mark the impact (using the MARK SYNC key).

Then, when spotting the effect, you set the IN, SYNC, and OUT points, copy the effect to the clipboard, cue the video to the point of impact, and PASTE the clip into position. If a SYNC point is present in the clipboard material, the car crash effect will be pre- and post-timed around that impact. This feature enables you to get the effect spotted precisely on the first attempt.

1.   **Cue to a desired location using the Transport, Auto locate, Jog Wheel or Enter Time functions.**

2.   **Press MARK SYNC during any transport mode.** This can be pressed during playback, record or with the transport stopped.

6.12.4 Recalling and Editing a MARKed Location Point

1.   **Press and release RECALL LOC, then press the MARK IN, MARK OUT, or MARK SYNC button** – whichever one you wish to edit.

2.   **Press ENTER.** The transport will be cued to the point you have chosen.

3.   **Press the ENTER TIME button, and make the desired changes.**

Once you have edited the current location to your satisfaction with ENTER TIME, press the MARK button you want changed. This will delete the previous MARK location and replace it with the edited one.

6.13 FOOT SWITCH FEATURES

RADAR II's Session Controller provides external contact closure control of several transport functions - these are typically foot-switches, but could be any type of switch.

The back panel of the Session Controller has three 1/4-inch input jacks. To these you may connect three momentary contact foot switches.

Please Note: The contacts in the foot switches must be wired as normally open.

The foot switch inputs are numbered from one to three, with the following functions:

<u>Switch #1:</u>   Toggles between PLAY and STOP.

<u>Switch #2:</u>   Cues to the current Auto LOCation point. (This switch actually replaces two button presses: RECALL LOC and ENTER.)

<u>Switch #3:</u>   Executes RECORD (from PLAY mode only.)

6.14 RADARVIEW ZOOM FEATURES

RADARVIEW is a graphical display interface for keeping track of edits, track meter values, sync settings, edit parameters, etc. RADARVIEW *is described fully in §2.12.*

RADARVIEW offers a Track Window Zoom, which uses the dedicated keys on the Session Controller's System Function keys.

The track window provides 14 zoom levels, allowing the screen to zoom from a bit over 4 seconds out to a 24-hour day.

To change the zoom level:

• **Use the Zoom In/Zoom Out keys on the System Function Group.**

Section 7 RADAR II Editing Features

This section describes RADAR II's powerful Audio Editing features, including a description of the editing Clipboard, looping, and single-track crossfade editing.

This section includes the following subsections.

7.1 INTRODUCTION

This section describes audio editing using RADAR II. Most editing features make use of the Mark In and Mark Out keys; these were described earlier in this manual.

The beauty of recording audio in the digital domain is not only the high dynamic range and low noise floor, but the ability to rearrange the running order of an audio track; be it music, sound effects or spoken words. This can be compared to the process of editing text using a computer-based word processor: RADAR II is a word processor for sound, not words!

7.1.1 RADAR II Editing Functions

Below is a list of the RADAR II editing functions and paragraph references:

Undo/Redo (§7.3)   Enables repeated UNDO/REDO on any RADAR II edit operation.

Crossfade Time (§7.1.3)   Enables setting/changing duration of RADAR II's digital crossfades.

LISTEN (§7.2.3)   Enables you to LISTEN to (audition) RADAR II's Clipboard.

CUT (§7.4)   CUTs between the Mark points– rejoins the cut ends, places the cut material on the Clipboard

COPY (§7.5)   COPIES between the Mark points– places the material onto the Clipboard. Original material unchanged.

PASTE (§7.6)   Places full Clipboard material starting at Edit mark; overwrites or pushes other material on the edited track(s) downstream (operator choice).
<u>If an Edit In is used,</u> places material starting there.
<u>If an Edit Out is used,</u> backtimes Clipboard material to *end* at the Edit Out point.

ERASE (§7.7)   ERASEs between Mark points.

MOVE (§7.8)   MOVES a segment of audio to another location, leaving a blank spot in its place. This function combines the ERASE and PASTE features, but doesn't put the MOVEd segment onto the Clipboard.

SLIDE (§7.9)   SLIDE moves the marked segment forward or back in millisecond (or frame) increments.

INSERT (§7.10)   INSERT inserts a blank space into the selected track(s) that is the same length as the material on the clipboard.

LOOP (§7.11)   LOOPs clipboard material end-to-end (with crossfades) for specified number of repeats. LOOP operates in either forward or reverse (backtime) directions.

MODIFY EDIT (§7.12)   Enables you to modify the parameters of the previous edit operation, without having to UNDO it, make changes, then make the edit again.

REVERSE (§7.13)   REVERSEs the Clipboard material - which may then be pasted into the Project as desired.

Mute Tracks (§7.14)   Temporarily turns off selected tracks at the disk unit, releasing disk bandwidth for seamless punch-out monitoring operations.

Import *.WAV (§7.15)   Allows you to import WAVE format sound files using RADAR II's floppy drive. Imported sound file(s) are automatically converted, then saved to the Clipboard for later use.

7.1.2 About the Clipboard...

Many editing functions make use of RADAR II's Clipboard, which is a <u>temporary</u> storage place for audio material while editing. *Clipboard material does not take up additional disk space, and is not stored after a system shutdown.*

Once audio is stored on the Clipboard (via a CUT, COPY, etc.), the clipboard material can be PASTED to another location as desired. In addition, the Clipboard material may be REVERSEd, then pasted into the project; the Import feature allows RADAR II to accept *.WAV files, which are converted and placed onto the Clipboard.

Please Note: Any new audio placed on the clipboard erases any previous clipboard audio!

7.1.3 Digital Crossfades on Edit Operations

Digitally "gluing" two different pieces of audio together in a CUT operation, for example, would normally cause an audible click or pop to be heard at the point where they are joined.

RADAR II overcomes this problem by crossfading the two clips together. Crossfading calculates a simultaneous digital fade-out and fade-in of the two audio clips, and this results in a seamless-sounding edit. Crossfading does not only occur when editing; crossfades are also calculated for the punch in and punch out points when recording over existing audio.

The default crossfade time is preset at the factory at 5 milliseconds which is usually sufficient to provide smooth transitions between clips and for punching-in. Any changes to the Crossfade Time are retained until changed again.

Changing the Default Crossfade Time

1.   **Press the MENU/PREV Button. Press the letter E (on the RE-8 QWERTY keyboard) to locate the EDIT sub-menu.**

2.   **Press ENTER.** The LCD will show the CROSSFADE TIME edit dialog:

3.   **Enter any number** *(up to 100 mSec)* **on the Calculator keypad or use the UP/DOWN buttons or jog wheel to enter the value. Press ENTER to save the setting and return to Ready mode.**

7.2 DEFINING AN AUDIO CLIP USING MARK IN/MARK OUT

Whether or not you will be using the Clipboard to PASTE audio to a different location, all editing procedures require you to define an **<u>audio clip</u>**. An audio clip is a piece of audio on one or more tracks that is located between two points in time.

7.2.1 Marking the Start and End of an Audio Clip

The MARK IN and MARK OUT buttons are used for defining the start and end locations of an audio clip. *(MARK IN sets the beginning of your clip; MARK OUT sets the end.).* You may use the transport controls (including Jog/Shuttle features described in §6.11) to locate the transport - placing MARK IN and MARK OUT points is described in §6.12.

Please Note: Both a MARK IN and a MARK OUT point are required for many RADAR II edits. If one or the other is not present at the time the editing function is selected, the system will respond with:

7.2.2 Marking a Sync Point

In addition to the In and Out points, RADAR II supports a Mark Sync feature, which is extremely useful in video post applications and any time when you need to edit based on an event during a piece of clipboard audio, etc. For example, if the production calls for a recorded clip of a car crash, you would mark the IN point as the beginning of the tire screech, and the OUT point at the end of the crash. However, to most accurately spot this effect to video, you can mark a "SYNC" point using the MARK SYNC button tomark the impact.

Then, when spotting the effect, you set the IN, SYNC, and OUT points, copy the effect to the clipboard, cue the video to the point of impact, and PASTE the clip

into position. If a SYNC point is present in the clipboard material, the car crash effect will be pre- and post-timed around that impact. This feature enables you to get the effect spotted precisely on the first attempt.

• **To mark a SYNC point, press the MARK SYNC button**

7.2.3 Selecting Track(s) for Editing

RADAR II supports editing on any number of tracks from 1 through 24; involved tracks do not have to be adjacent to each other. In many editing operations, RADAR II prompts you to select the track(s) to be used in the edit. Tracks may be selected using the Track Arm buttons, on the Session Controller.

7.2.4 Auditioning the Clipboard

You may, at any time, audition RADAR II's clipboard using the LISTEN feature. Follow this procedure to audition the clipboard.

1. **Press the SHIFT button.** (The LED in the button will light.)

2. **Press the LISTEN/PASTE button;** you will hear playback of the audio on the Clipboard. *(If there is no audio on the Clipboard, the LCD will show an error message.)*

3. **Press the LISTEN/PASTE button again** to STOP playback, and to return to Ready mode.
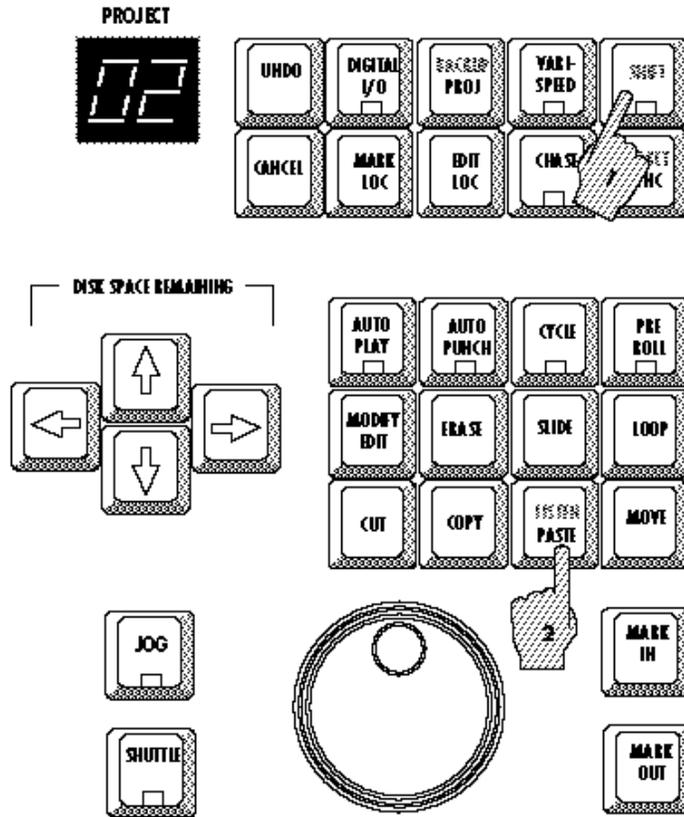
Audition Clipboard Operation

<u>**LISTEN from the Front Panel:**</u>

1.   **Press the Menu/Cancel button, then press the UP and/or DOWN buttons to display the Edit Menu. Press ENTER.**

2.   **Select LISTEN from the Edit menu by using the UP and/or DOWN keys. Press ENTER again to audition the clipboard. Press STOP to end playback.**

7.3 UNDO/REDO FUNCTIONS

RADAR II provides a one-step Undo-Redo feature that permits you to "try out" editing operations without the fear of permanently losing audio.

Along with the UNDO function is the REDO function. REDO will "undo" the UNDO if you should decide to keep the edited part after all.

Performing an UNDO or REDO:

1.   **Press the UNDO button after performing a RECORD or after any EDIT operation.** The display will read:

Please Note: RADAR II shows the last operation by name in the undo or redo menu. Thus, if the last action was an ERASE, the menu would read: "UNDO ERASE?"

2.   **Press ENTER.** RADAR II will UNDO the previous operation. Press CANCEL if you want to abort. Repeat this procedure to REDO.

Please Note: If there is no function to undo, the system will display:

7.4 CUT

CUT removes a section of audio from the selected track(s). The "cut" section is then placed on the Clipboard ready to PASTE to another location. The audio on either side of the in and out locations is seamlessly rejoined, as follows:
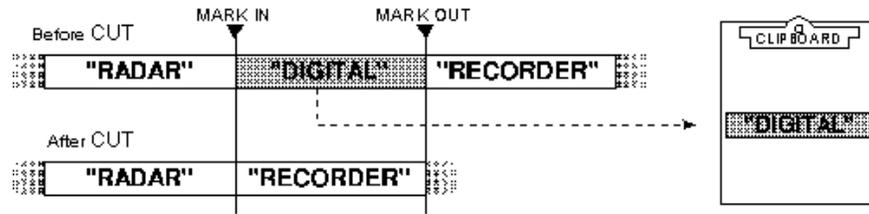
Please Note: RADAR II uses single-track digital crossfade to minimize or eliminate the "click" or "pop" when rejoining dissimilar audio levels. The crossfade length defaults to 5 milliseconds - normally a quite sufficient length. However, the crossfade length is adjustable - refer to §7.11, Modify Edit, for further information.

CUT Procedure

1.   **Define the start point of the clip you want to CUT by locating to the beginning of the clip with either the Jog Wheel, Transport or ENTER TIME functions, then press MARK IN.**

2.   **Define the ending point of the clip you want to CUT by locating to the end of the clip in the same manner, then press MARK OUT.**
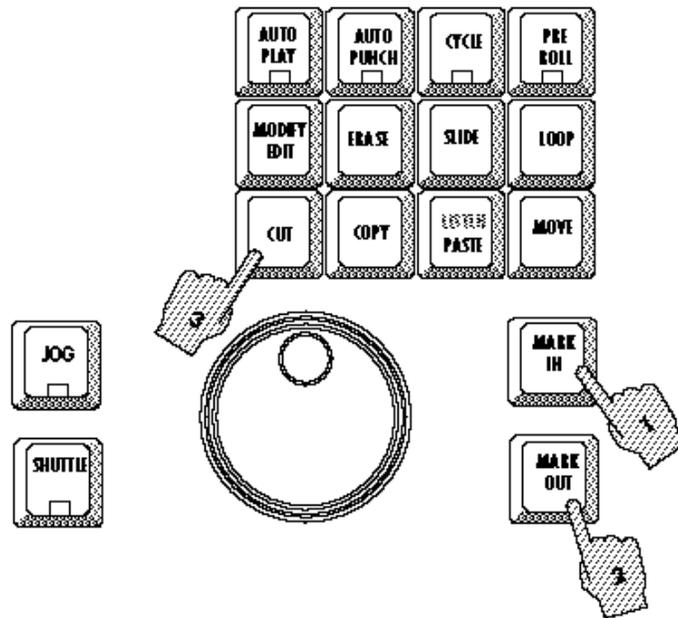
3.   <u>**From the Session Controller:**</u>   **Press the CUT button (from the Editing keys).** The system will respond as shown below.

4.   **Select how you want to CUT by using the cursor keys to select ALL (cut across ALL tracks in system), or TRACK ARM (cuts only those track(s) selected using the Track Arm buttons.) Press ENTER.**

5.   (If you selected TRACK ARM:) **Select the track(s) you require using the Track Arming buttons:**

Track Select Operation

6.   **Press ENTER.** RADAR II will perform the CUT operation and return to Ready mode. The sections of audio at the MARK IN and OUT points (on the selected tracks) will be joined together. *The CUT material is now on the clipboard, ready to be used elsewhere as required.*

7.5 COPY

When you COPY audio to the clipboard, you make a duplicate of the audio clip onto the Clipboard (ready for use elsewhere.) *The original material remains unchanged.*
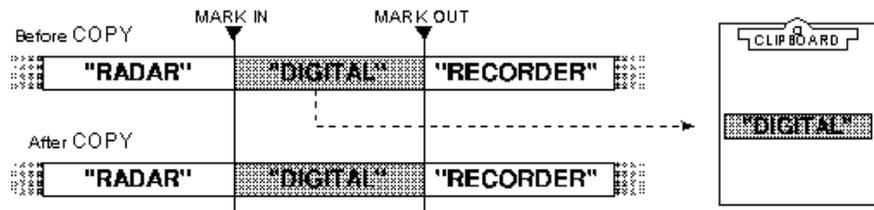
COPY Procedure

1.   **Define the start point of the clip you want to COPY by locating to the beginning of the clip with either the Jog Wheel, Transport or ENTER TIME functions, then press MARK IN.**

2. **Define the end point of the clip using the same method(s), then press MARK OUT.**

3. **Press the COPY button.**
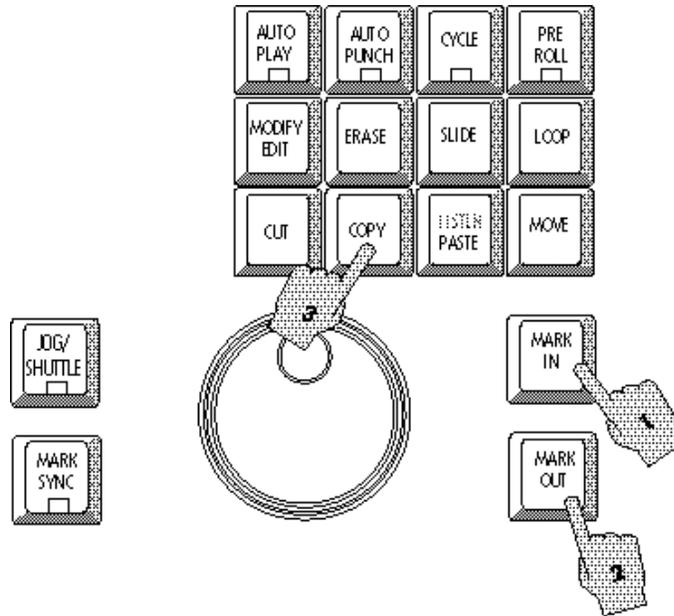
4. **The LCD display prompts you to select** tracks for the Copy. Use Cursor Left/Right to select ALL (copies ALL tracks between Mark In and Mark Out); or TRACK ARM (copies material on selected track(s) only).

5. **Select the track(s) you require from the Track Arming Group:**
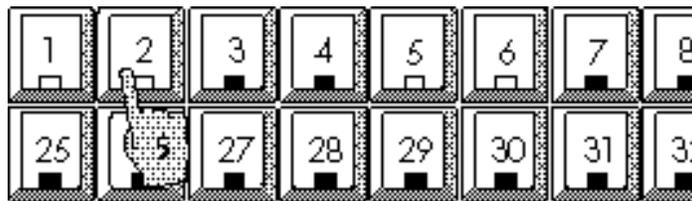
Track Selection

6. **Press ENTER.** RADAR II performs the COPY and return to Ready mode.

The clip is now on the clipboard ready for your next operation.

Edition 1

7.6 PASTE

PASTE copies the contents of the Clipboard to the current time code location, or to any other location of your choosing.

You have your choice of having the PASTE <u>overwrite</u> audio (paste over existing audio, without changing track length), or to be <u>inserted</u> into it (splice, thus pushing audio at the PASTE point downstream.)

Please Note: RADAR II uses single-track digital crossfade to minimize or eliminate the "click" or "pop" when rejoining dissimilar audio levels. The crossfade length defaults to 5 milliseconds - normally a quite sufficient length. However, this crossfade length is adjustable – refer to §7.11, Modify Edit, for further information.

PASTE Options

By using Mark In as a paste point, the beginning of the clipboard material is pasted at that point, and the entire clipboard is pasted in.

However, by using Mark Out as the paste point, the end of the clipboard material is pasted, and the earlier clipboard material is backtimed. See the following diagram to put these options into perspective:
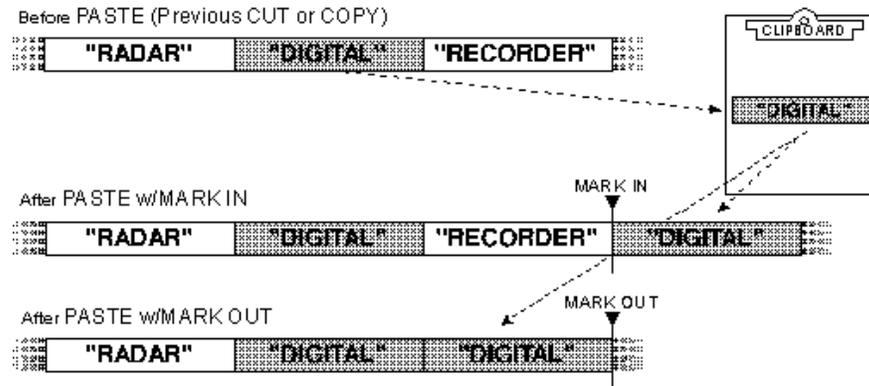
Please Note: If you are unsure about what is actually on the Clipboard, use the Listen function to audition the Clipboard. See §7.2.

PASTE Procedure:

1.   **Press PASTE.** The LCD will ask if you want to PASTE your clip to the same or another track:

2.   **To PASTE to the same track(s) as where the clip originated from, press ENTER.** These track(s) will be selected and flashing.

To PASTE to a different track, **select any other track(s) from the Track Arming Group.** The cursor will move to OTHER, and the new track(s) will be flashing. **Press ENTER to continue.**

IMPORTANT PASTE NOTES

If your clip originates from multiple tracks, you may select any other tracks as destinations. However, a multiple track PASTE will always end up in the numerical order from which it came. For example, if the clip originated on tracks 1 and 2 you are able to PASTE it to tracks 6 and 9; track 1 maps to track 6, and track 2 maps to track 9. It is not possible within one operation to simultaneously PASTE track 1 to 9 and track 2 to 6.

PASTE operations across 8-track drive boundaries (for example from track 1 to track 9) take slightly longer to complete. This is because the audio data must be underlined **recreated on the destination drive. Such a PASTE operation also consumes space on the destination drive.**

Please Note: If you select more (or fewer) tracks that are represented on RADAR II's Clipboard, the system will respond with:

4.   The LCD asks if you want to Insert or Overwrite at the PASTE location:

Press ENTER if you wish to accept the Insert default.

If you want the clip to overwrite at the new location, cursor to Overwrite and press ENTER. *(Refer to the following diagram):*
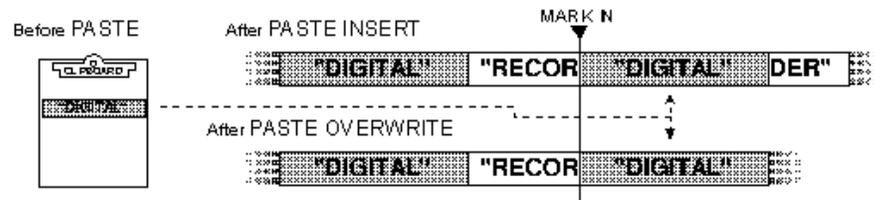
Please Note: If you paste with only a Mark Out set, the system will back-time the clipboard material so that it ends at the Mark Out point. Insert & Overwrite operate in the same manner as described for Mark In if only a Mark Out is used.

5.   The LCD will ask where you want to PASTE the clip. *(The default time is the current transport location before the PASTE operation.)*

Use the Jog Wheel, Transport or the Numeric Keypad to cue to where you want the PASTE point to be.

6.   Paste will automatically place the START of the Clipboard material at the point you entered in Step 5.

To BACK TIME the Clipboard material, press MARK OUT, followed by ENTER.

To PASTE starting at the entered time, press ENTER.

Multiple Paste Feature

You may specify multiple PASTE TO locations by pressing MARK IN or MARK OUT, then changing the PASTE time and pressing MARK IN or OUT again. Repeat this as needed (the LCD display shows the number of PASTEs RADAR II will do) then press ENTER to process the PASTEs.

You may also change the PASTE TO time simply by playing and marking with the transport in motion.

7.7 ERASE

The ERASE function deletes audio from the selected track(s), without changing their length(s).

To do an ERASE, you select the track(s), and the beginning and end points of the section; the ERASEd clip is <u>not</u> placed on the Clipboard *(but it can be restored using the UNDO function).*
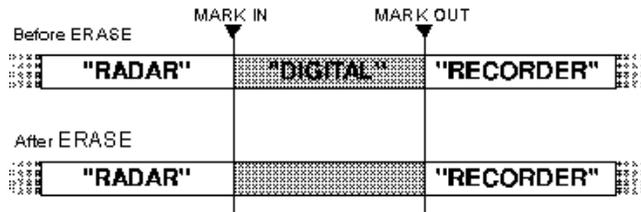
ERASE Procedure

1. **Define the start point of the clip you want to ERASE by locating to the beginning of the clip with either the Jog Wheel, Transport or ENTER TIME functions. Press MARK IN.**

2. **Define the ending point of the clip you want to ERASE in the same manner, then press MARK OUT.**

3. **Press the ERASE button.**
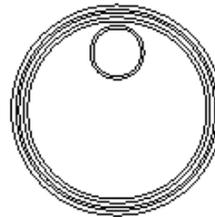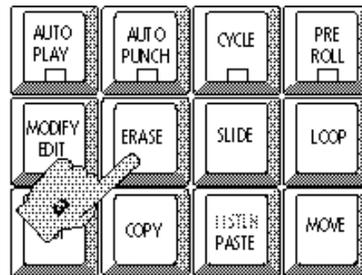
4. The LCD will ask you to select which track(s) to ERASE:

Select how you want to ERASE by using the cursor keys to select ALL (erase between marks across ALL tracks in system), or TRACK ARM (erases only those track(s) selected using the Track Arm buttons.) Press ENTER.

5.   (If you selected TRACK ARM:) **Select the track(s) you require using the Track Arming buttons.**

Track Select Operation

6.   **Press ENTER.** RADAR II will perform the ERASE operation and return to Ready mode. Audio material on the selected tracks(s) is now ERASED from the Project, and HAS NOT BEEN PLACED ON THE CLIPBOARD!!!   *Un-Do will restore the audio to its original location.*

7.8 MOVE

MOVE "relocates" an audio clip to another place and/or another track, leaving silence in the original location. *In other words, MOVE incorporates the ERASE and PASTE operations in a single edit.*   The clip's start or end point can be placed at the MOVE TO position in the same way as PASTE.

Please Note: The MOVED clip is not placed on the clipboard *(and does not displace any audio currently on the clipboard.)*

MOVE Procedure

1. **Define the start point of the clip you want to MOVE by locating to the beginning of the clip with either the Jog Wheel, Transport or ENTER TIME functions. Press MARK IN.**

2. **Define the ending point of the clip you want to MOVE in the same manner, then press MARK OUT.**

3. **Press MOVE.**
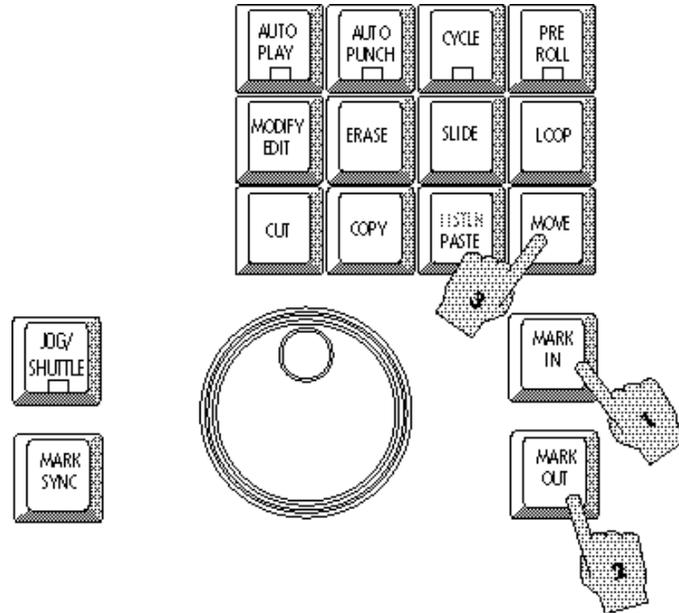
4. The LCD will prompt you to select which tracks your clip is to originate from and the track arming buttons will flash:

    Use the cursor keys to select ALL (moves ALL tracks between Mark In/Out points), or TRACK ARM (moves only those track(s) selected using the Track Arm buttons.) Press ENTER to continue.

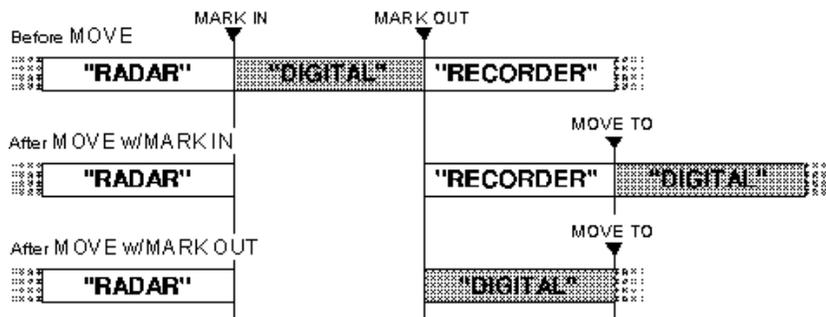5. (If you selected TRACK ARM:) **Select the track(s) you require using the Track Arming buttons. Press ENTER to continue.**
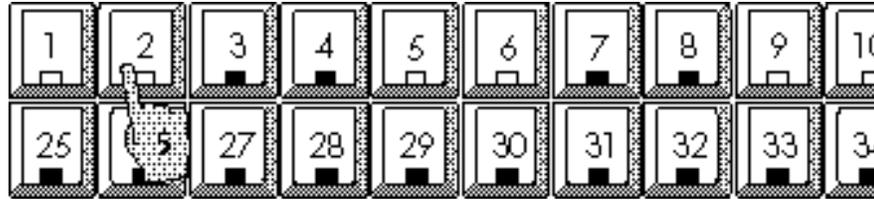
Track Selection

6. **Press Enter.** The system will respond with:

7. **To move the material to the same tracks, cursor to SAME then press Enter. To move that material to other tracks, cursor to Other then press ENTER..** If you select Other, the system prompts you to select tracks:

Select the desired track(s), then press Enter to continue.

Please Note: If your clip originates from multiple tracks, you may select any other tracks as destinations; however a multiple track MOVE always ends up in the numerical order from which it came. Also, a MOVE across 8-track drive boundaries uses disk space on the destination drive(s). For further information, refer to "IMPORTANT PASTE NOTES" in §7.6.

8. The LCD asks if you want to Insert or Overwrite at the MOVE TO location:

Press ENTER if you wish to accept the Insert default. If you want the clip to overwrite at the new location, cursor to Overwrite, then press ENTER. Refer to the following diagram for RADAR II's action:

After MOVE INSERT

MARK IN   MARK OUT   MOVE TO

"RECOR   "DIGITAL"   DER"

After MOVE OVERWRITE

"RECOR   "DIGITAL"
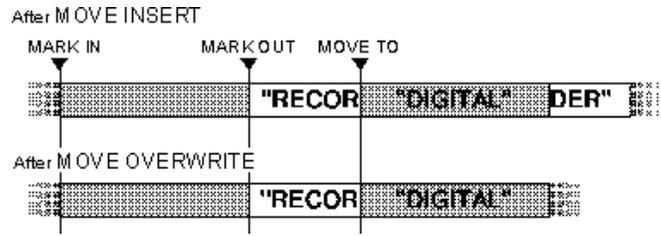
9.   RADAR II responds with the Move To dialog (below). **Use the Jog
         Wheel, Transport, Numeric Keypad, Enter Time, or Recall Loc features
         to cue to where you want the MOVE point to be.**

Please Note: If you move with only a Mark Out set, the system will back-time the
clipboard material so that it ends at the Mark Out point. Insert & Overwrite
operate in the same manner as described for Mark In if only a Mark Out is
used.

10.   MOVE will automatically place the START of the marked segment at the
         point you entered in Step 5.

         **To BACK TIME the MOVE segment, press MARK OUT, followed by
         ENTER.**

         **To place the MOVE segment starting at the entered time, press
         ENTER.**

RADAR II will perform the MOVE operation and return to Ready mode. No audio
has been placed on the Clipboard!   *Un-Do will, however, restore the audio to its
original location.*

7.9 SLIDE

SLIDE allows you to shift the timing of a section relative to the other tracks. It is similar to the MOVE function but with an editing interface more convenient for nudging audio back and forth in millisecond (or Frame) increments.

Please Note: When a clip SLIDEs in time, it overwrites any audio that was there previously.
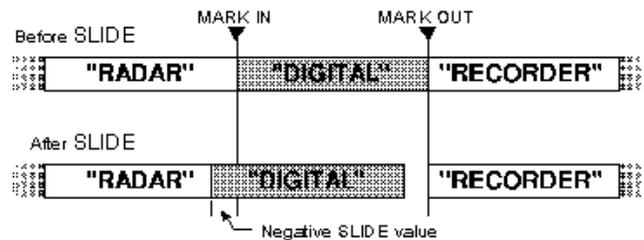
SLIDE Procedure

1.   **Define the IN point of your clip by locating to the beginning of the clip with either the Jog Wheel, Transport or ENTER TIME functions, then press MARK IN**

2.   **Define the OUT point for the clip in the same manner, then press MARK OUT.**

3.   **Press SLIDE.**
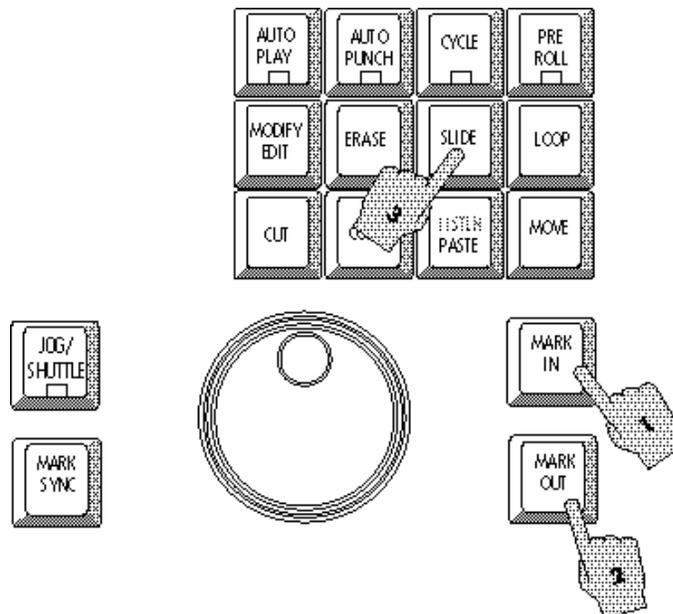
4.   The LCD will ask you which tracks you want to SLIDE:

Use the cursor keys to select ALL (moves ALL tracks between Mark In/Out points), or TRACK ARM (moves only those track(s) selected using the Track Arm buttons.) Press ENTER to continue.

5.   (If you selected TRACK ARM:) **Select the track(s) you require using the Track Arming buttonS.**
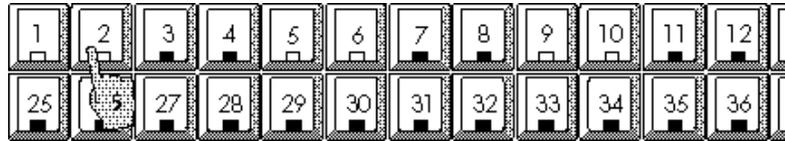
6. **Press ENTER.** The LCD will prompt you for the number of frames (or milliseconds) you want to SLIDE the clip:

   Enter the slide value directly by pressing either the + or - buttons and typing a number on the numeric keypad. (Or, use Cursor Up/Down or the Jog Wheel to enter a positive or negative value.) *You may use the PLAY & STOP keys to audition the area while in the Slide Time dialog.*

7. **Press ENTER to complete the SLIDE and return to Ready mode.** SLIDE does not place any audio onto the Clipboard.

Please Note: SLIDE operations may be performed using either FRAMES or MILLI-SECONDS. You may select Slide Time Units through the Preferences menu, described in §4.3.4.4.

7.10 INSERT

INSERT splices in a blank space (a piece of leader is a good analogy) into the selected track(s). The length of the blank space (leader) is the same as the length of the clipboard material.

For example, let's say the clipboard contains a piece of audio 3 seconds and 20 frames long (00:00:03:20.00).

An INSERT operation will place a 3:20.00 blank segment into the selected track(s), beginning at the current MARK IN point. Everything else on those track(s) after the MARK IN point is pushed downstream by that length; in our case, 3 seconds & 20 frames.

7.11 LOOP

LOOP copies a clip consecutively for the number of times you select. This is useful for creating background ambience tracks as well as rhythmic effects. The clip can be LOOPed in a positive or negative direction relative to the MARK OUT point. LOOPing in a positive direction causes the clip to repeat starting at the MARK OUT point while LOOPing in a negative direction causes the clip to repeat previous to (and ending at) the MARK OUT point.
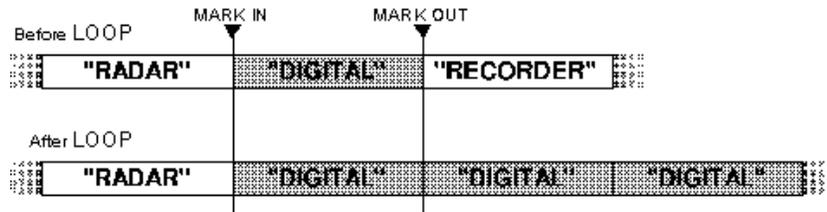

LOOP Procedure

1. **Define the IN point of the clip to be looped by locating to the beginning of the clip with either the Jog Wheel, Transport or ENTER TIME functions, then press MARK IN**

2. **Define the OUT point for the clip in the same manner, then press MARK OUT.**

3. **Press LOOP.**
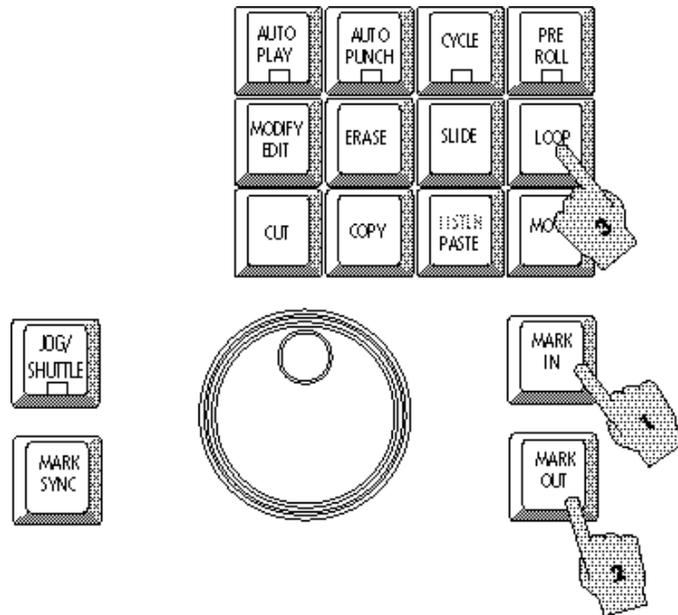
4.   The LCD will ask you which tracks you want to LOOP:

Use the cursor keys to select ALL (loops ALL tracks between Mark In/Out points), or TRACK ARM (loops only those track(s) selected using the Track Arm buttons.) Press ENTER to continue.

5.   (If you selected TRACK ARM:) **Select the track(s) you require using the Track Arming buttonS. Press ENTER to continue.**
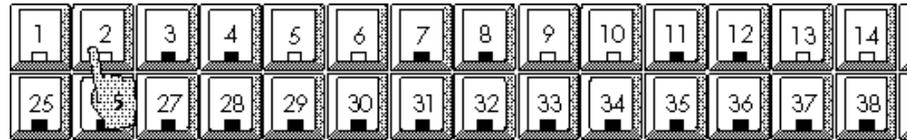
6.   **Press ENTER.** The LCD asks if you want to Insert or Overwrite at the LOOP TO location:

Press ENTER if you wish to accept the Insert default. If you want the loop(s) to overwrite at the new location, cursor to Overwrite, then press ENTER. The system will respond with:

7.   **Enter the number of LOOPs desired using the Jog Wheel, Transport or the Numeric Keypad. Press ENTER.** The system will loop the material the selected number of times. No audio has been placed on the Clipboard during this edit. *Un-Do will, however, restore the audio to its original location.*

Please Note: You may enter a Negative Loop count - this will loop the marked segment the entered number of times, ENDING at the current Time Code location.

7.12 MODIFY EDIT

The MODIFY EDIT function allows you to change any or all parameters of the preceding edit. It is a more convenient way of modifying an edit without the need to UNDO and re-enter new values when you need to make a change.

With the MODIFY EDIT function, you even have the ability to change the crossfade time of an edit (see the following description).

Parameters available for MODIFY include MARK IN/OUT locations, crossfade time, original and destination tracks, insert or overwrite and any other parameters peculiar to individual editing functions (such as Slide Time or Loop Count).

MODIFY EDIT Procedure

1. **Press MODIFY EDIT button after completing an EDIT operation.** The LCD will show the name of the previous EDIT and the first dialog that pertains to it.

2. **Make changes to each parameter as desired, followed by ENTER.** For each EDIT operation, there is a different set of values to change. These are duplicates of the original operation with, in certain cases, the addition of CROSSFADE TIME.

Please Note: If you do not need to change a parameter, simply press ENTER to continue to the next one.

3. **Once you have completed the dialogs, press ENTER.** The new values you have set will be applied to the EDIT for you to audition.

7.13 REVERSE *(REVERSES CLIPBOARD MATERIAL)*

REVERSE takes the material on the clipboard and reverses its running order. The reversed clip may be placed into the project material as desired. Reverse provides a powerful editing feature, used frequently when creating ambient backgrounds for motion pictures and television production.

Reverse Feature Application

A typical workstation user can only LOOP audio in one direction. However, listeners can easily detect such a repeated loop, recognizing its pattern even if it is mixed deeply under other effects.

If the material was a human breathing, and a typical workstation user looped it, the listener would hear: "inhale/inhale/ inhale/inhale."

RADAR II's REVERSE feature enables you to loop audio in forward and in reverse– this masks the "repeated loop" characteristic, making for a more natural sound.

Given the above example of human breathing, after a RADAR II-created reversed loop, the listener hears a more natural "inhale/exhale/inhale/exhale."

<u>**To create a reversed-loop ambience track:**</u>

1.   **Record audio to be REVERSE-LOOPED.**

2.   **Locate to the head of the recording, then place a MARK IN. point.**

3.   **Locate to the end of the recording, then place a MARK OUT point.**

4.   **COPY the marked segment to the clipboard.**

5.   **Press MENU/PREV, then select the EDIT menu and press ENTER. Scroll down to the REVERSE item, then press ENTER again.**

6.   **Locate the transport to the end of the original recording, then back up the transport a few frames.**

7.   **PASTE the reversed clipboard material into the project.**

8.   **Listen to the track to make sure you have achieved a smooth forward/backward sound.**

9.   **Mark the head and tail of the track with MARK IN/MARK OUT.**

10.   **LOOP the audio as many times as necessary to fill the scene.**

7.14 MUTE TRACKS FEATURE

RADAR II's Mute Tracks feature enables you to free up disk bandwidth to enable seamless punch out monitoring. This feature is not the same thing as track on/off or track solo - track solos are monitor functions, and do not affect the amount of disk activity.

Disk activity is critical when attempting seamless audio punch out monitoring. If you perform a punch-in/punch out recording operation, the punch-out will be seamless (i.e. no gap - a smooth switch between input and track monitoring), if the following condition is met:

The punch-out monitoring will be seamless if the number of "free" disk tracks equals or exceeds the number of tracks you are recording on that disk unit.

RADAR II supports a maximum of twenty-four tracks of audio data, either playback or record. If your punch-out would exceed the maximum disk bandwidth, you may make use of RADAR II's MUTE TRACKS feature.   With Mute Tracks, you may temporarily "turn off" tracks that are not in use, increasing the amount of disk drive throughput.

1.   **To use Mute Tracks, press "M" on the Session Controller's QWERTY keyboard, or select it from the Edit menu.** The system will respond with:

2.   **Select ALL (mutes ALL tracks in system), or TRACK ARM (mutes only those track(s) selected using the Track Arm buttons.) Press ENTER.**

3.   (If you selected TRACK ARM:) **Select the track(s) you require using the Track Arming buttons.**

4.   **Press ENTER.** RADAR II will perform the MUTE operation and return to Ready mode.

5.   **Perform the desired punch in/punch out operations as desired.** (The tracks stay in the muted state until you un-mute them.)

6.   **Repeat steps 1 through 3 to turn off Mute Tracks.**

7.15 IMPORT *.WAV TRANSLATOR FEATURE

RADAR II includes a built-in translator for WAV-format sound files. These files are commonly used with PC-based sound hardware, samplers and workstations. The entry point for these files is RADAR II's floppy disk drive; file(s) read from floppy disk are translated, then posted to RADAR II's Clipboard for use.

IMPORT Procedure

1. **Insert a DOS-formatted floppy disk drive containing the file(s) to be imported into RADAR II's floppy disk drive.**

2. **Press MENU/PREV, select the EDIT menu, then press ENTER.**

3. **Scroll down the menu to select the IMPORT *.WAV item:**

4. **Press ENTER.** The system will respond with:

    then finally:

5. **Use the cursor up/down arrows (or Jog wheel) to select the desired file, then press ENTER to continue.** The system will respond with information about the sound file including MONO or STEREO, encoding method, Sampling Rate, and gain (in percent):

6. **You may specify the desired SAMPLE RATE** *(range: 8 to 50 kHz)***, and Gain** *(range: 0 to 999%)* **for the imported file.** *(Use Cursor left/right to move between fields.)* **When the Sample Rate and Gain fields are set as desired, press ENTER to write the sound file to RADAR II's clipboard.**

Section 8 Backup & Restore Operation

This section describes RADAR II's data backup and restore features, using the optional 8mm data cartridge drive.

This section includes the following subsections.

8.1 BACKUP OVERVIEW

Because RADAR II's hard drive(s) have a finite capacity they will eventually become full in the same way as a reel of tape or a floppy disk does. When this happens, the contents of the drives must be copied to another type of storage media to make room for new material. This procedure is known as "archiving" or "backup". The reloading process is called "restoring". Restored material exists in the exact same state of completion as when it was backed up so projects can be started and finished much later.

The RADAR II system is available optionally with an Exabyte Eliant drive. This device uses 8 millimeter tape to store all of RADAR II's audio data. This tape drive was selected for its high speed and the low price of the recording media.

8.1.1 Data Sets Concept

RADAR II's backup/restore software operates using the concept of "data sets."

> _A Data Set is whatever material you have included in one backup operation._

In a Backup operation, you may choose to:

- Back up ALL projects (including all audio data) at once, or
- Back up all versions of the current project, or
- Back up JUST the current project, or
- Back up a group of projects that you selected.

Each single backup operation creates a "data set". (If you backup the entire system using ALL PROJECTS, that is one Data Set; if you backup the current project only, that is also a Data Set.

On Restore, you are offered two choices - you may restore ALL data sets on the tape, or you may select some of the data sets on the tape to restore. Therefore the smallest unit available for a backup or restore is a Data Set. You can restore two data sets, but you cannot restore only a half of a data set.

RADAR II's Data Set concept was designed to provide flexibility in backup and restore operations - you decide what to back up (and how to do it) based on how you will be restoring the information. For example, before a major system software upgrade, you may decide to back up the system's entire contents using one data set - when you restore this you need only perform one operation. However, in day-to-day use you may back up every client's project as a separate data set - thus when they book their next session, you need only restore their data set (and not an entire system's worth of data.)

How you bundle and back up your projects will determine how fast the data is backed up, and how flexible it will be to restore. Projects sharing audio will be backed up faster by bundling them into one data set, since any audio common to both projects will only be backed up once. However, if you want to restore just one project from that data you can't, since the entire data set needs to be restored.

8.1.2 SCSI Basics

SCSI (Small Computer System Interface) is a specification used for transmitting data between a main computer host and various peripherals. It allows all the parts of a computer system to communicate with one another. In our case, RADAR II is the computer host and the peripherals are internal and external hard disk drives, and perhaps a tape backup unit.

The SCSI specification allows the host (RADAR II) to address up to 7 separate devices. Depending on the system configuration, not all of these devices (SCSI ID's) will be available for the tape backup unit; however a typical RADAR II system (one internal hard disk, one internal SCSI controller) has five free SCSI IDs.

Each SCSI device has an identification number assigned to it that falls between 0 and 7. On stand alone SCSI devices this is usually set using a hardware switch. RADAR II's internal SCSI number assignments are set at the factory. SCSI peripheral devices generally have two 50 pin connectors: an in and a thru. This is done to allow chain connection of multiple devices. RADAR II is the host and as such needs only one connector.

Connected to the last device in a SCSI chain is a terminator plug. Physically, it looks like a SCSI connector without a cable and it electrically completes the loop connection between all the devices in the chain.

IMPORTANT!

The SCSI terminator's importance <u>cannot</u> be overstated - this must be connected for SCSI communication between RADAR II and any external devices to occur. If it is left unconnected, there is the danger of losing audio files or corrupting RADAR II's file system.

See §2.3 for more information on installing the terminator plug.

8.2 EXABYTE ELIANT DRIVE OPERATION

Verifying Proper Connection of the Tape Drive

1.   **Press MENU/PREV.**

2.   **Scroll using the UP/DOWN buttons or press D on the QWERTY keyboard to proceed to the DIAGNOSTICS submenu, then press ENTER.**

3.   **Select the SCAN SCSI BUS item using the cursor keys, then press ENTER again.** The system will scan the SCSI bus; the LCD will then show the details of the first SCSI device.

4.   **Use cursor up/down (or the jog wheel) to scrolling through the ID numbers.** The tape drive will likely be ID number six, however, if it is not, continue scrolling until you find it on the SCSI bus.

Please Note: If the tape drive device is not shown in the LCD, this may be because the SCSI connections are made incorrectly, or the external SCSI terminator is not attached. Be sure that the SCSI terminator is correctly connected.

5.   **Press CANCEL to exit and return to Ready Mode.**

8.3 BACKUP PROCEDURE

The functions and features of the 8 mm tape drive make it possible to safely back up your data. In order to get the best performance out of your tape drive over a period of time, be sure to follow the procedures and recommendations given in this section. And always be certain to use high quality 8 mm tape cartridges designed for computer data backup purposes, in order to ensure the integrity of your data.

Regular, commercially available 8mm video cartridges should <u>never</u> be used for backing up data. (The tape drive should automatically eject incompatible tapes.)

8.3.1 Data Cartridges

8.3.1.1 Recommended 8mm Data Cartridges

It is important to always use the recommended tape in order to achieve optimum performance from the tape drive and safety for your data.

Recommended 8mm (Data Grade) Tape

EXABYTE (U.S.) tape

Length (capacity)	Otari Part No.	Exabyte Part No.	Sony Part No.
112 m (5 GB)	PZ9A056	EX1T8003A	QG-112M
54 m(2.5 GB)	PZ9A057	EX1T8002A	QG-54M
15 m (670 MB)	PZ9A058	EX1T8001A	n/a

8.3.1.2 Loading 8mm Tape Cartridge

1. **Press the Eject button on the drive to open its access door, it it is not already open.**

2. **Place a blank tape in the drive, according to the following diagram:**
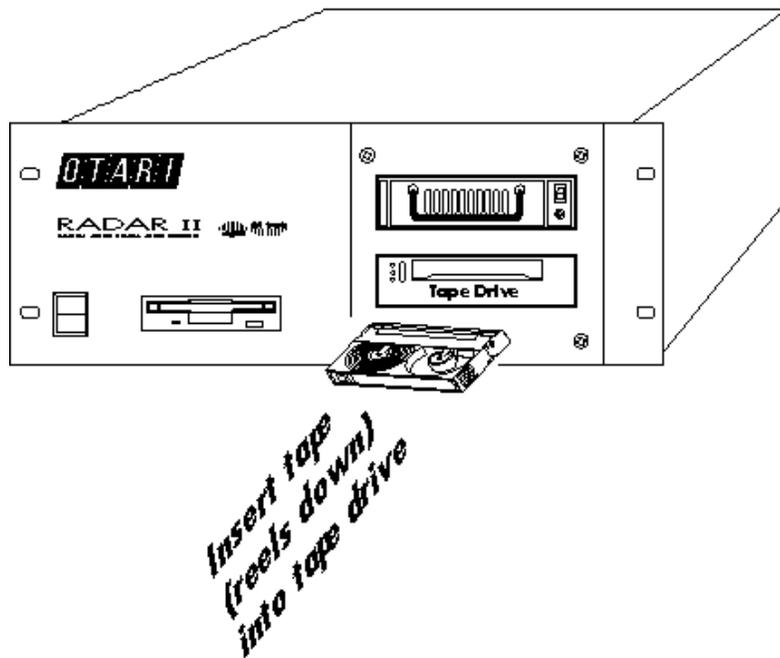
3. **When an 8 mm cartridge is inserted into the drive, apply a gentle pressure to the back of the cartridge until it is drawn in by the drive.**

8.3.2 Backup Procedure

1.   **Press MENU/PREV.** Scroll using the UP/DOWN buttons or press P on the QWERTY keyboard to proceed to the PROJECT submenu.

2.   **Press ENTER.**

3.   **Press ENTER once more to enter the BACKUP dialog.** The LCD will present the first backup option (detailed information about these options appears in the following paragraphs):

4.   **Use the Cursor up/down keys to select the desired Backup operation, then press ENTER.**   The LCD will present the default backup name indicating the time and date of the backup. (You may edit this name using the QWERTY buttons on the Session Controller.)

5.   **Press ENTER to accept the name and proceed with the backup operation.** Backup will begin and the system will lock out any further key presses. The LCD will show the time remaining until the procedure is finished.

     Upon completing the backup, the tape will be ejected and the LCD will display a BACKUP COMPLETE message.

6.   **Remove the 8mm tape,** carefully label it, and store it in a cool, dry place.

8.3.3 Overwrite vs. Append

Every backup operation presents you with a choice of either appending the current project to the end of the tape, or overwriting any previous material on the tape.

<u>Overwrite Mode:</u> Overwrite mode should only be used in two circumstances: a) to format a brand-new tape before its first use as a RADAR II backup tape, and b) if you explicitly want to erase the contents of a previous backup tape.

IMPORTANT NOTE

Be **very sure** that you want to perform an overwrite operation on a tape that contains data. There is <u>**NO WAY**</u> to recover any audio from a tape that has been overwritten.

<u>Append Mode:</u> This mode is used most of the time, and simply appends the new dataset to the end of the last dataset on the tape.

Every time you perform a backup operation, RADAR II builds a Table of Contents which contains all datasets on the tape. This information is available to you when restoring audio – and enables you to restore only the audio that you need.

8.3.4 About Backup Options...

RADAR II provides four options for backup: All Projects, Current Versions, Current Project, and Selected Projects.

8.3.4.1 All Projects

Backup via the All Projects method takes all projects (and all audio) on the system and backs it up to tape. If the amount of audio required by the All Projects method exceeds the capacity of a single tape, RADAR II prompts the user to insert additional tape(s) when appropriate (see §8.4).

When you select the "All Projects" method, the system prompts you to enter a name for the dataset. (This name defaults to "FULL BACKUP", but you may enter any name of up to 16 characters to be more descriptive, and to avoid later confusion!)

After entering and confirming the name for the data set, RADAR II them prompts you to select either the "Overwrite" or "Append" option before proceeding.

Please Note: The system always defaults to "Append" because "Overwrite" is potentially destructive to previous data set(s) on the tape.

8.3.4.2 Current Versions

The Current Versions backup option enables you to back up all versions of the project you are currently working on. For example:

Assume you were currently working on Project #3, which was named "Hit Song v3. Let's also assume that there are five versions of this particular project. If you select "Current Versions" under the Backup menu, RADAR II marks the files for all five versions of this project, and backs up this data to tape.

As with all backup operations, RADAR II prompts you to name this dataset, and also whether you want to append the dataset to the tape, or to overwrite the tape starting at the beginning.

8.3.4.3 Current Project

As with the "Backup All" feature, backing up audio and playlist data from RADAR II using the Current Project method is simple to use. In this mode, RADAR II marks the currently active project (audio and playlist information), and proceeds with the backup. (Again, you are prompted for a dataset name and must select Append or Overwrite)

8.3.4.4 Selected Projects

The Selected Projects method is the most widely used backup method, since it enables you to specify multiple projects to be included in a single dataset.

When you select this method, RADAR II displays the number of the currently active project (say, "Proj: 01") in the upper left corner of the LCD display, followed by "SEL#:00" to the right. To select the project(s) to include in the backup, use the cursor up/down keys (or the jog wheel) to move through the projects - then press the RE-8's spacebar to make the selection (the SEL#: field increments by one). Once you have selected a project, a "+" is shown to the right of the project name. Repeat this process until the desired project(s) for this dataset are selected.

Please Note: If you inadvertently select a project but don't want to include it in the backup dataset, simply locate the project (using the cursor keys or jog wheel), and press the spacebar to remove the entry from the selected list.

Once all projects are selected, you may proceed for by pressing the ENTER button.

8.3.5 Aborting a Tape Backup Operation

If you must cancel a tape backup operation, press the CANCEL button. The system will prompt for a confirmation, then will break out of the backup operation.

8.3.6 Multi-Tape Backups

A RADAR II fitted with internal and external disk drives contains a lot of audio data, potentially more than can fit on one 8mm tape. In these cases, the system ejects the first tape, and displays the message:

Remove and label the first tape, then insert another tape and press ENTER to continue.

Please Note: Tapes are numbered beginning with 1. However, each tape is also time-stamped, so that tape #2 from Friday's backup is distinguishable from Tape #2 from Monday's backup.

IMPORTANT! If the LCD displays any message other than BACKUP COMPLETE, the backup has not been correctly saved and you must repeat the procedure. See section 8.7 for error message descriptions.

8.4 RESTORE OPERATION

To restore data from 8mm tape:

1.   **Load the desired RADAR II Backup tape into the drive.**

2.   **Select, from the Main menu, the Projects menu.**

3.   **Under the Project menu, select the RESTORE item (scroll down to it using the cursor keys, or simply press "R" from the QWERTY keyboard), then press ENTER.** The system will respond with the Restore selections, as shown:

4.   **Use the cursor up/down keys to select the desired action (e.g. restore ALL data sets, or restore SELECTED data sets.)Press ENTER once you have made your selection.**

If you selected "All Data Sets, the restore will begin after a confirmation. Do not disturb the system during this time! If you selected Selected Data Sets, continue with the following procedure.

Restore Selected Sets Procedure

If you selected "Selected Sets", the system will display the header information about the first project:

Refer to the diagram below, and use the cursor keys to review the available information about each set:

Press ENTER. LOADing will begin and the system will lock out any further key presses. The LCD will show the time remaining until the procedure is finished. Upon completion, the tape will be ejected and the LCD will display the RESTORE COMPLETE. message.

Reviewing Tape Contents with Restore Selected Feature

You may use the Restore Selected option to simply check the contents of a tape!

1. **Insert tape, then choose :"Restore Selected" from the Restore menu.**

2. **Through the View Project routine (diagram above), select the Projects field.**

3. **Press Enter while displaying the Projects field to display a list of all projects in the data set.**

4. **Press Cancel to eject the tape if you do not wish to restore now.**

IMPORTANT!   If the LCD displays any message other than RESTORE COMPLETE, the data may be incorrectly loaded and you must repeat the procedure. See §8.7 for error message descriptions.

8.5 TAPE DRIVE ACTIVITY INDICATORS

The 8mm tape drive provides LED indicators to allow for proper care and feeding, as well as an indication of general drive health and if cleaning is needed. These LEDs indicate status as follows:
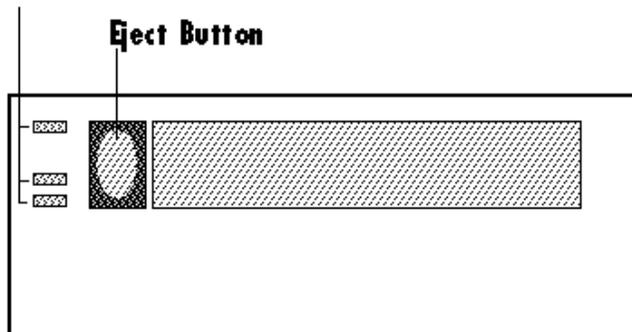
Use the chart shown below to translate the Status Indicators. Please note that SLOW means flashing at 1 flash per second, FAST means flashing at 4 per second, and Irregular means flashing based on drive activity.

	Top LED (errors)	Middle LED (SCSI)	Bottom LED (motion)
Power-On Self Test (First Part)	On	On	On
Power-On Self Test (To Completion)	Off	Irreg.	On
FAILED Power On Self Test	Off	Irreg.	Fast
Ready— No Tape Loaded	Off	Irreg.	Off
Ready— Tape Loaded	On	Irreg.	Off
Normal Tape Motion	Slow	Irreg.	Off
High-Speed Tape Motion	Fast	Irreg.	Off
SCSI Bus Reset	On	Irreg.	On
ERROR	Off	Irreg.	Slow
Time to Clean Tape Drive	Fast	Irreg.	Fast
Cleaning Tape Loaded	Slow	Irreg.	Off

CAUTION

Should drive cleaning be necessary, use an approved 8mm Data Drive cleaning cassette! Any other type of cleaning cassette (i.e. a camcorder cleaner) will NOT perform the correct cleaning cycle, and may damage the drive!! *(See §8.6)*

8.6 8MM TAPE DRIVE CLEANING PROCEDURE

The tape head/tape path of the 8mm tape drive requires cleaning once per month, or after approximately 60 GB of data transfer. RADAR II will automatically detect if the drive needs cleaning, and will display a message on the LCD display:

Please Note: If this message appears, you should clean the tape drive as soon as possible. The tape drive will still function ; the message is a reminder.

To clean the tape head and path, an Otari-approved cleaning cassette MUST be used.

Procedure:

1. **Prepare the unit for cleaning by powering on the chassis.**

2. **When the power-on self test is completed (approx. 30 seconds), press the Eject button to open the drive; if a tape is in the drive, remove it.**

3. **Place the cleaning cassette into the drive and close the drive door.** The drive senses that a cleaning tape was installed, and immediately begins the cleaning procedure.

4. When the cleaning system is completed (approx. 15-20 seconds), the cleaning cassette is automatically ejected. **Remove the tape from the drive, and MARK it carefully with the date of cleaning.**

Please Note: The cleaning tapes provide a specific number of drive cleanings. DO NOT attempt to re-wind or re-use a cleaning tape - drive damage could result. If the cleaning tape is ejected without entering the cleaning cycle, then the tape has reached the end of its useful life and should be discarded.

8.7 BACKUP ERROR MESSAGES

Should there ever be a problem with backup/restore operation, one of the following error messages may be presented. Contact Otari Technical Support for more information.

NO BACKUP DEVICE:	SCSI cable not connected correctly. Check connection of cable and terminator plug.
Tape drive not mounted:	Turn off RADAR II, reconnect cable and terminator and power up again.
CAN'T SAVE(READ) HDR:	No tape in the backup device.
Tape in backup device is write protected:	Slide tab on tape to unprotect.
Tape in backup device is bad:	Replace tape.
Tape in backup device is incompatible:	Use only approved Data Storage 8mm tape.
CAN'T LOAD TAPE:	No tape in the backup device.
Tape in backup device is bad:	Replace tape.

**Tape in backup device
is incompatible:**   Use only approved Data Storage 8mm tape.

CAN'T UNLOAD TAPE: Tape device Eject mechanism is jammed. Contact
                                Otari service department.

**INVALID HDR, Unknown
tape format (LOAD only):**   Tape in drive has been formatted with an
                                incompatible file system.

CAN'T SAVE AUDIO: Tape in backup device is bad. Replace tape.

CAN'T READ AUDIO: Tape in backup device is bad. Replace tape.

Appendix A   Hardware/Software Installation

This section provides hardware and software installation procedures, as well as software upgrade installation.

This section includes the following subsections.

A.1   INTRODUCTION

This Appendix provides hardware installation information, and software installation procedures.

A.2 RADAR II PHYSICAL INSTALLATION

A.2.1 Rack Size

RADAR II requires a rack that has a minimum of 4 spaces, and is at least 20 inches deep. (The actual chassis is slightly less than 20 inches deep; the extra space is required for AC power and audio connectors.)

A.2.2 Rack Mounting

To rack-mount RADAR II, slide its chassis into the rack horizontally, while supporting the back panel carefully. Fasten the chassis to the rack rails using the supplied rack mounting screws.

A.2.3 Airflow/Cooling

RADAR II must have <u>unrestricted</u> in and out airflow from the chassis rear openings. If airflow is insufficient due to blockage, audio performance may be degraded and component life will be shortened.

A.2.4 Rough Handling

If RADAR II is to be used in a "mobile" environment, it is likely to be bounced in transit. Therefore, the chassis should be mounted in an aircraft-type flight case with a proper shock-resistant inner shell. RADAR II's internal components are very sturdy but may fail if subjected to extreme shocks.

Please Note: To avoid undue stress on the faceplate mounting bracket during transit, RADAR II's support feet should be resting on the bottom of the rack or on a device mounted below.

A.2.5   AC Power Level Setting

CAUTION!

It is extremely important when first hooking up RADAR II that, before the unit is powered up, the line voltage selector switch is set to the correct position. If this switch is set incorrectly, extensive damage to RADAR II's internal circuitry may occur!

RADAR II has a universal power supply that will accommodate AC voltages and frequencies as provided anywhere in the world. The standards used by different countries fall in either of two ranges - 100 to 120 volts at 50/60 Hz or 220 to 240 volts at 50 Hz. A switch on the back panel of RADAR II determines which of these is to be used to provide power.

PLEASE CHECK the AC voltage setting on the back panel for the proper line voltage for your area! If you set this incorrectly, poor system performance (and/or smoke) may result! If the voltage setting is incorrect, use a flat-blade screwdriver to change it:
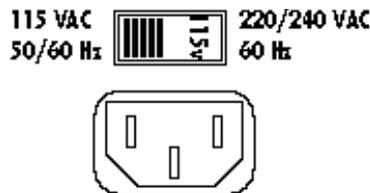
A.2.6 Grounding

The analog audio circuitry in RADAR II operates with a separate ground, which is not connected to the AC power ground. This allows the user to determine the grounding scheme that best suits their studio's requirements.

There are two terminals on the back panel of RADAR II where these grounds are broken out. The chassis ground (CHS GND) is connected directly to the metal chassis and the ground wire of the incoming AC power line. The analog ground (ANA GND) is connected to the sleeve of each audio input and output including the SMPTE In and Out.

RADAR II is shipped with the ANA GND and the CHS GND disconnected. When grounding problems do occur such as hum or excessive crosstalk, the ANA GND and CHS GND may be strapped together with a short piece of wire, or the analog ground may be connected to the technical ground shared by the other audio gear in the environment.

A.3 CONTROLS & INDICATORS OVERVIEW

A.3.1 Rear Panel Connectors
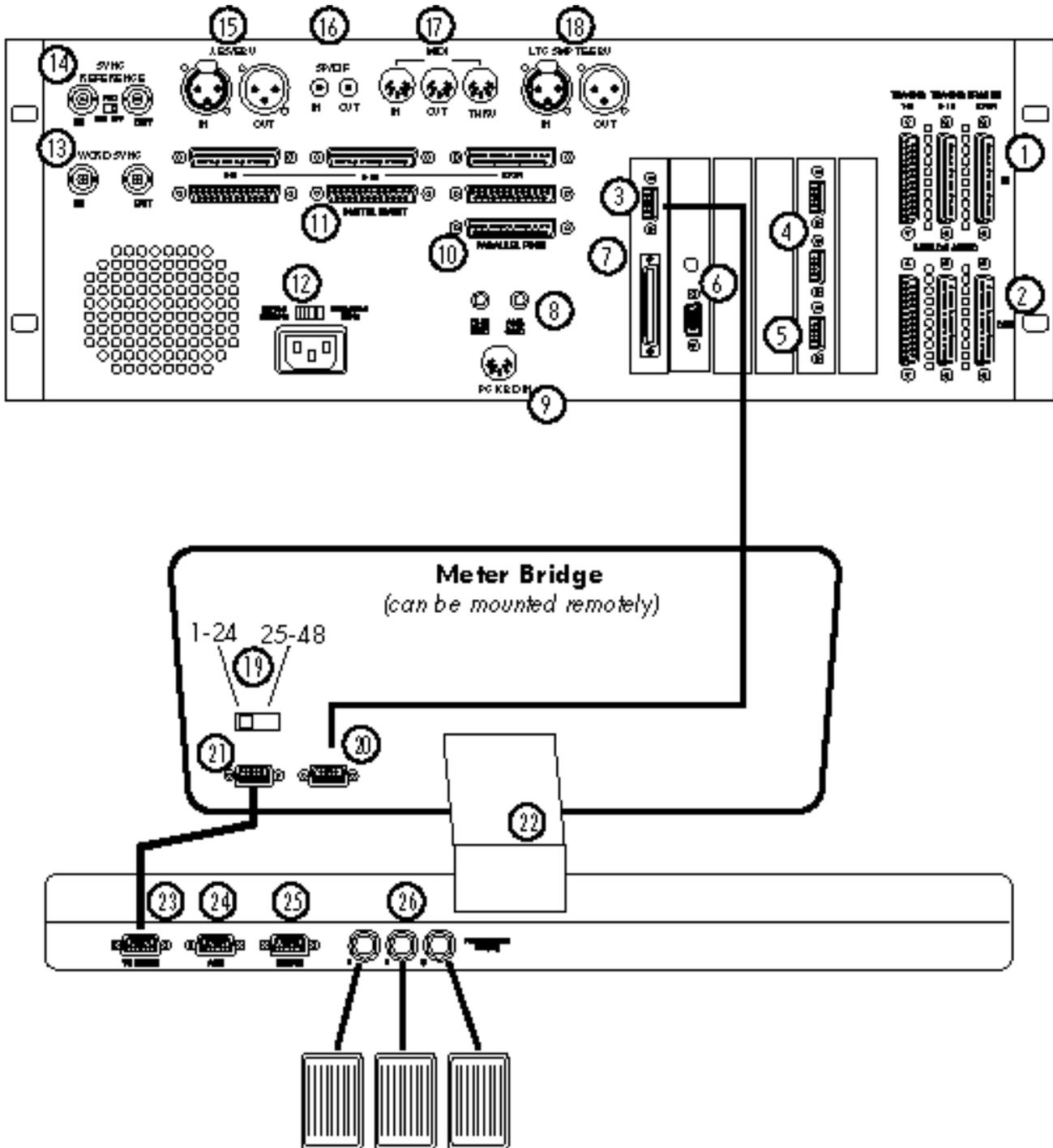
1. **Audio Inputs:** Analog audio inputs. *DB-25 female; one per eight tracks. Wiring diagram on Page A-7.*

2. **Audio Outputs:** Analog audio outputs. *DB-25 female; one per eight tracks. Wiring diagram on Page A-7.*
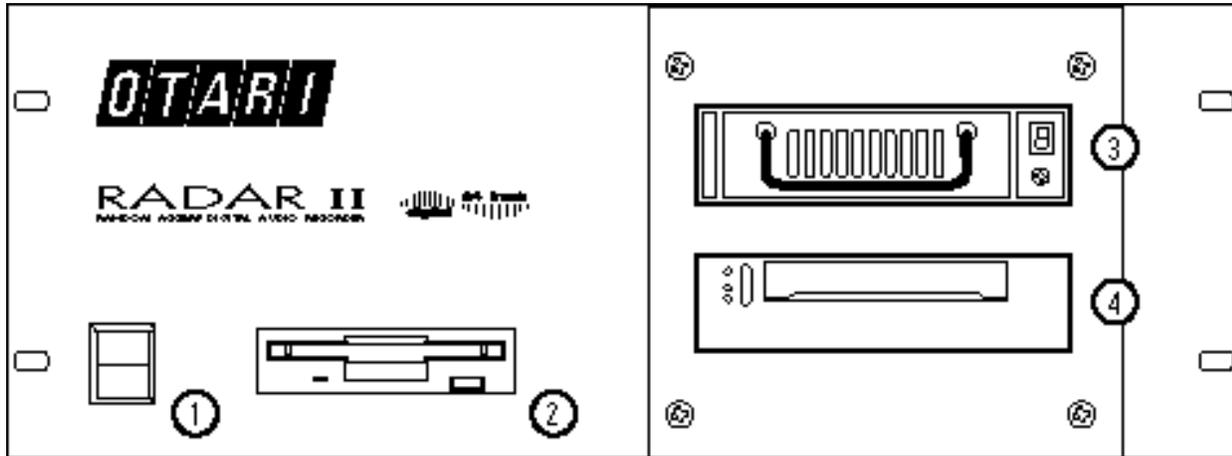
3. **To Meterbridge or Session Controller:** Connects to Meterbridge or Session Controller, as shown.

4. **RADARLINK In & Out:** Enables one master to control up to seven slave RADAR II systems *(see §A.4.6) DB-9: (m) x1; (f) x1*

5. **External Serial Machine Control :** Connects to an external control device, using Sony 9-pin machine control. Enables remote control of RADAR II's transport, and external track arm commands which conform to Sony P2 protocol. *DB-9 (m) x1*

6. **VGA Output:** Provides RADARVIEW output to a standard SVGA color video monitor. *DB-9 (m) x1*

7. **External SCSI Port:** Connects to external SCSI unit(s) supported by RADAR II, such asexternal disk drive bays.   If no external devices are connected, the SCSI Terminator (supplied) must be installed! *DB50 (f) x1*

8. **External Grounding:** Connection with external ground or strapping of these connectors is only required when grounding problems occur. *(See §A.2.6.)*

9. **PC Keyboard Connection:** Diagnostic connector provided for Otari technical support. *DIN-8 x1*

10. **Parallel Port:** For optional printer connection.

11. **TDIF Digital I/O:** Refer to §A.4.3 for hookup, §3.17 for operation. *DB25 (f) x3*

12. **AC Power Receptacle/Voltage Setting:** Connects to AC outlet using the power cable provided, selects AC mains voltage.

13. **Word Clock Sync:** Provides Word Sync input & output, w/ switchable 75-ohm termination. *BNC x 2*

14. **Video Sync:** Provides Black Burst (Video) Sync input & output, w/ switchable termination. *BNC x 2*

15. **AES/EBU I/O:** Provides AES/EBU input & output on XLR connectors. Refer to Section 5 for further information. *XLR x 2*

16. **SP/DIF:** Provides SP/DIF I/O on two RCA connectors. *RCA x 2*

17. **MIDI In/Out/Thru:** Provides MIDI Time Code (MTC) input/throughput. *DIN-5 x 3*

18. **SMPTE Time Code In/Out:** Connect SMPTE IN to a SMPTE source. *XLR x 2*

19. **Meterbridge Track Range Switch:** Selects track range of meter bridge (either 1-24 or 25-48)

20. **"From RADAR":** Connects meterbridge to RADAR II unit; also used to connect to additional Meter Bridge in 48 track configuration. *DB-9*

21. **"To Session Controller":** Connects meterbridge to Session Controller unit. *DB-9*

22. **Mounting Bracket:** Mounts meterbridge to Session Controller. *Meterbridge may be mounted remotely.*

23. **"From Meterbridge or RADAR":** Connects Session Controller to meterbridge to RADAR II unit. *DB-9*

24. **"Aux 1":** *DB-9*

25. **"Aux 2":** *DB-9*

26. **Foot Switch Inputs:** Connect to momentary foot switches to provide hands-free control over cue-to-location, RECORD and playback. *(see §6.3.)*

A.3.2 RADAR II Front Panel Controls & Indicators

Refer to this diagram to navigate RADAR II's Front Panel:

1: Power On/Off switch: For more information see §2.4

2: Floppy Drive: High density 3.5 inch floppy disk drive for software upgrades & occasional file import. *(See Appendix A for further information.)*

3: Drive Bay 1:   Can hold one half-height hard disk drive in a removable carrier. Basic installation contains one 9GB hard disk drive.

4: Drive Bay 2:   Can hold one half-height hard disk drive in a removable carrier. Basic installation contains one 8mm tape backup unit.

IMPORTANT!

System boot software is already installed on the RADAR II hard drive; therefore it is not necessary to keep the supplied system software diskette in the disk drive. Do, however, keep the diskette handy should it be needed in the future.

A.4 ELECTRICAL INSTALLATION

A.4.1 Analog Audio Inputs & Outputs Overview

RADAR II has 24 analog audio inputs and outputs on the rear panel.   These signals are carried on six DB-25 connectors, each of which carries eight channels. Each connector is bolted directly to the chassis for maximum strength.

A.4.1.1 Balanced vs. Unbalanced Audio Signals

Balanced audio cable has three conductors: two conductors carrying the same signal at opposite polarities and a ground. Balancing generally results in lower susceptibility to electromagnetic (EMI) and radio frequency (RFI) induced noise, and permits longer cable runs without risk of interference. As well, balanced cables do not necessarily need to be grounded at both ends and this means fewer ground loop problems.

On the other hand, unbalanced cables have two conductors only: one for signal and one for return. The return must always be grounded in order for signal to flow. This scheme is more susceptible to radio or electromagnetic interference and poor quality cables can be noisy if they are handled. Many studios, however, successfully use unbalanced lines and you should not have any problems if the audio equipment in your studio is properly grounded. See the discussion of grounding at the end of this section.

A.4.1.2 Audio Reference Levels

The Audio Level preference setting provides four level settings for the analog inputs, and four level settings for the analog outputs. The selections are:

- **+24 dBu**   • **+22 dBu**   • **+20 dBu**   • **+18 dBu**

These settings refer to scale (or maximum levels). Put another way, these are all +4 dBu operating levels, with +20, +18, +16, and +14 dBu of headroom.

Example: With RADAR II's input operating level set to +22, a tone of 0 VU coming from a +4 dBu console will cause RADAR II's meters to read -18 (dB below full scale).

If the "+24 dBu" input operating level is selected, the RADAR II meter(s) would show -20 (dB below full scale).

To set or change the system's default audio level(s), select the Audio Level item from the Preferences menu.

A.4.2 Audio Connections - Analog

Cable harnesses for the analog inputs/outputs conform to the DA-88 standard. Pin-out of DB-25 female Analog Input Connectors are as follows:

1	CH 8 + IN	14	CH 8 - IN
2	GROUND	15	CH 7 + IN
3	CH 7 - IN	16	GROUND
4	CH 6 + IN	17	CH 6 - IN
5	GROUND	18	CH 5 + IN
6	CH 5 - IN	19	GROUND
7	CH 4 + IN	20	CH 4 - IN
8	GROUND	21	CH 3 + IN
9	CH 3 - IN	22	GROUND
10	CH 2 + IN	23	CH 2 - IN
12	CH 1 - IN	24	CH 1 + IN
13	N/C	25	GROUND

Pin-out of DB-25 female Analog Output Connectors are as follows:

1	CH 8 + OUT	14	CH 8 - OUT
2	GROUND	15	CH 7 + OUT
3	CH 7 - OUT	16	GROUND
4	CH 6 + OUT	17	CH 6 - OUT
5	GROUND	18	CH 5 + OUT
6	CH 5 - OUT	19	GROUND
7	CH 4 + OUT	20	CH 4 - OUT
8	GROUND	21	CH 3 + OUT
9	CH 3 - OUT	22	GROUND
10	CH 2 + OUT	23	CH 2 - OUT
12	CH 1 - OUT	24	CH 1 + OUT
13	NOT CONNECTED	25	GROUND

A.4.3 Audio Connections - Digital

RADAR provides both AES-EBU (professional) and S/PDIF (high-end consumer) digital audio interfaces. AES/EBU uses one <u>balanced</u>, XLR cable per pair; S/PDIF uses one unbalanced RCA cable per pair.

RADAR can record stereo digitally on any two adjacent track pairs, and can output digitally from any two adjacent track pairs. Complete instructions for this feature appear in Section 3, §3.17.

Please Note: Be sure to use the highest-quality shielded cables and best quality connectors for any digital audio application!

If using AES/EBU:

1. Connect an AES/EBU source to RADAR's AES/EBU IN XLR (female XLR connector), as shown below.

2. Connect RADAR's AES/EBU output to the desired device using a properly shielded cable and a female XLR cable connector, as shown.

If using S/PDIF:

1. Connect an S/PDIF source to RADAR's S/PDIF IN XLR (female RCA jack), as shown below.

2. Connect RADAR's S/PDIF output to the desired device using a properly shielded cable and a male RCA cable connector, as shown.
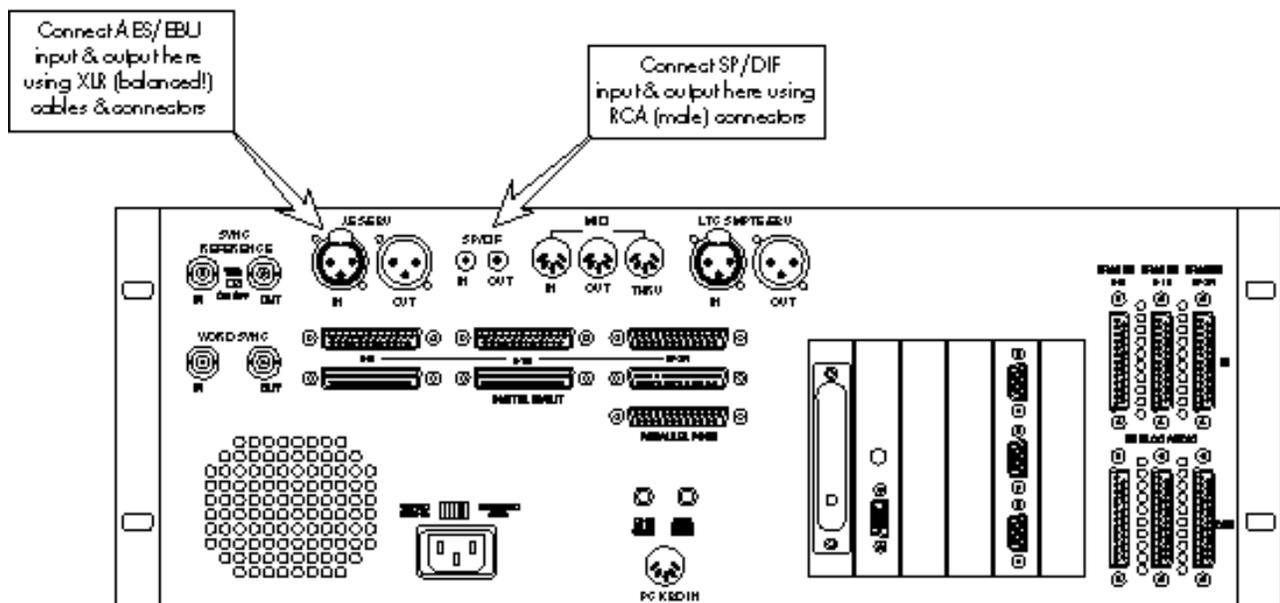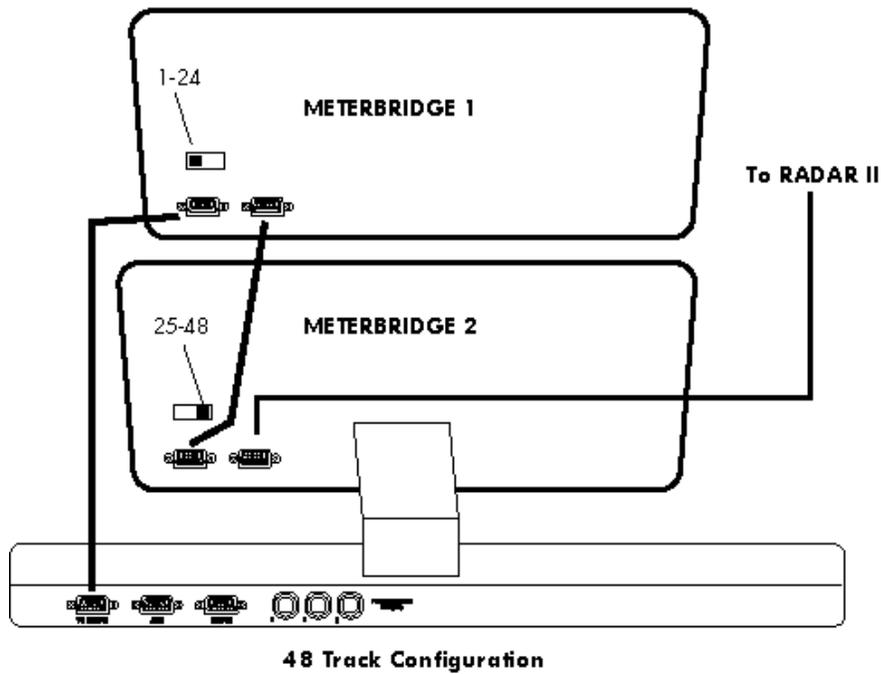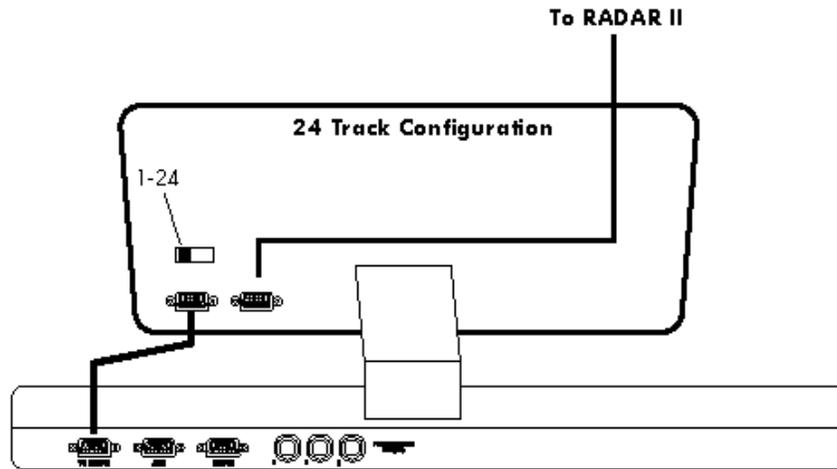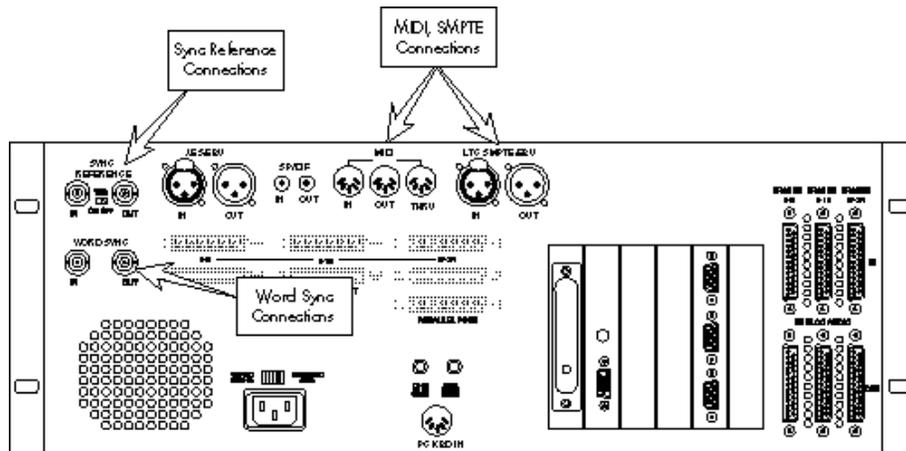
A.4.4 SESSION CONTROLLER/METERBRIDGE CONNECTIONS

Refer to the following diagrams to connect RADAR II to the Session Controller and Meterbridge. Note the hookup differences in a 48-track configuration.

A.4.5 EXTERNAL SYNC CONNECTIONS

A.4.5.1 Time Code Connections Diagram

Refer to this diagram showing RADAR's external sync connection locations:

A.4.5.2 Time Code Input

RADAR accepts LTC time code on an XLR connector. This signal may be balanced or unbalanced.

-        **Connect the time code source to RADAR's LTC/SMPTE IN jack.**

A.4.5.3 Time Code Generator Output

RADAR's internal SMPTE generator may be used as a master source for slaving other devices. *The output is always active - however this may cause problems for some external sequencers, so the generator output may be disabled via the Preferences menu.*

-        **Connect an XLR cable (balanced or unbalanced) to RADAR's SMPTE OUT jack.**

A.4.5.4 MIDI Time Code (MTC) Connections

MIDI Time Code (MTC) is a sync protocol used by samplers and MIDI control equipment. The MIDI inputs and outputs use standard DIN-5 connectors. MIDI IN is passed through to MIDI THRU; MIDI OUT outputs MTC, even if the system is not set to sync to MIDI.

A.4.5.5 Video Sync Connections

If using Video Sync (house sync), connect the sync source to the Sync Reference In BNC connector on RADAR's rear panel.

The Sync Reference Out connector provides a hard-wired loop through; you may connect this output to other device(s) requiring the same sync source.

Electrical Termination of Video Source

If the video source requires ground termination, a 75   termination resistor may be inserted using the switch between the Sync Reference connectors. Generally, termination is required if RADAR is the last device (or only device) in the sync chain, and if there is no downstream device connected to Sync Reference Out.

Do not insert the termination resistor if any device is connected to the Sync Reference Out BNC!

A.4.5.6 Digital Word Clock Connections

If using RADAR with an external digital word clock source, connect this source to the Sync Reference In connector. If a loop-through is required, you may connect the Sync Reference Out BNC to the device requiring the same digital word clock.

Please refer to the above note regarding termination for digital Word Clock; insert the termination resistor if necessary to maintain proper signal conditions.

A.4.6 External SCSI Device Installation

RADAR uses the SCSI interface standard both for internal operation and for utilizing external resources, such as external hard disk drives. This paragraph describes hookup instructions for both types of device.

A.4.6.1 SCSI Basics

SCSI (Small Computer System Interface) is a specification used for transmitting data between a main computer host and various peripherals, allowing all the parts of a computer system to communicate with one another. In our case, RADAR is the computer host and the peripherals are hard disk drives, or a tape backup unit.

The external SCSI port on RADAR consists of a 50 pin connector to which you may connect a SCSI cable to communicate with external SCSI devices.

The SCSI specification allows the host (RADAR's CPU) to address up to 7 separate devices. Remember that RADAR claims one SCSI device for each of its hard disks or tape drive, and one for its internal SCSI controller (the CPU).

Each SCSI device has an identification number assigned to it that falls between 0 and 7. On stand alone SCSI devices this is usually set using a hardware switch. *RADAR's internal SCSI number assignments are set at the factory - SCSI ID7 is reserved for RADAR's CPU.*

SCSI peripheral devices generally have two 50 pin connectors: an in and a thru. This is done to allow chain connection of multiple devices. RADAR is the host and as such needs only one connector.

Connected to the last device in a SCSI chain is a terminator plug. Physically, it looks like a SCSI connector without a cable and electrically, it completes the loop connection between all the devices in the chain.

IMPORTANT!

The SCSI terminator's importance <u>cannot</u> be overstated - this must be connected for SCSI communication between RADAR and any external devices to occur. If it is left unconnected, there is the danger of losing audio files or corrupting RADAR's file system.

A.4.6.2 SCSI Terminator Installation

Before system operation, PLEASE CHECK that the SCSI terminator (supplied with the system) is attached to the rear panel's SCSI connector.

Please Note: If you have an external disk bay hooked up to RADAR's SCSI connector, make sure that the supplied SCSI terminator is attached to one of the SCSI connectors on the external unit!

A.4.6.3 External Disk Drive Chassis Installation/Hookup

In addition to a backup device, RADAR also support additional disk drives, generally installed in an external chassis (Otari Corporation part no. *EDB-3* or equivalent.)

This hookup procedure for the external drive bay is the same as installing the backup unit - you must "chain" connect the external chassis, and you MUST install the SCSI terminator on the LAST device on the chain.

Please Note: It is necessary to check the SCSI ID numbers for all connected devices to ensure proper system operation. In a system with one internal SCSI disk, three external SCSI disks, and a backup unit, the ID numbers should be set according to the ID map below. *If assistance is required, please contact OTARI technical support.*

SCSI ID map for fully-configured RADAR system:

ID 0:	**Three internal hard disk drives**
ID's 1, 2,3, 4, 5:	**Three EXTERNAL hard disk drives**
ID #6:	**Tape Backup Device**
ID #7:	**Reserved for RADAR's CPU.**

IMPORTANT!

You must change the disk configuration (though the System Menu) in order for RADAR to recognize external hard disk drives. *This procedure is provided in §4.3.1.4.*

A.4.7 RADARLINK Installation

The RADARLINK feature enables up to five (5) slaved RADAR systems to be controlled from one Master RADAR (using an optional RE-8). The slave RADAR systems are locked to the sample clock of the master system.

Standard DB-9 cables (straight-wired pin to pin; available at most computer stores) are attached from the RADARLINK OUT connector on the Master system to the RADARLINK IN connector of the slave system, then daisy-chained for all remaining RADARLINK slave systems (up to 5). *Operating instructions for* RADARLINK *appear in Appendix D.*

A.4.8 Remote Diagnostics MODEM Hookup

RADAR includes Remote Modem Diagnostics software, which enables OTARI Technical Support personnel to dial up a user's RADAR in the field, and perform diagnostics procedures and monitor system operation to isolate problems. This feature requires the user to supply a standard V.32 or V.34-compatible external modem.

To install the External Modem:

Connect the external modem using a DB-9 (straight pin-to-pin) cable to the AUX 1 port on the Session Controller.

A.5 SOFTWARE INSTALLATION

A.5.1 Initial Installation Procedure

Please Note: RADAR is shipped with system software already installed This procedure is provided should you need to re-install the system software at any time.

1.   **BACK UP any current audio projects to 8mm tape.** This tape back up is just a precaution - software installation should not change existing audio in any way.

2.   **Shut down RADAR, if not already off. Insert the floppy disk containing RADAR software into the floppy disk drive.**

3.   **Turn the system power on.** The system will respond with its boot procedure status messages:

followed by...

then...

After booting from floppy disk, RADAR prompts for confirmation of the software installation:

The system reads the software version numbers from floppy and the system. If you are downgrading, the menu will say so, and will provide the actual version numbers.

<u>Running Software from Floppy Disk:</u> You may elect to run RADAR from the software on the floppy disk, without installing it to the hard disk. To do so, simply select NO on the Upgrade? confirmation, then respond with YES to the prompt: "RUN RADAR FROM FLOPPY?".

4. **To proceed with the upgrade, select YES, then press Enter to start the installation process.** The LCD display will show a number of messages during the process:

```
Updating KS1
Initing Disk 0*
Initing Disk 1*
Initing Disk 2*
Copying EM8B.BIN
Copying RADARH.BIN
Copying RADARL.BIN
```

* *skipped if the disks are already initialized...*

then, finally...

5. **Press a key to continue.** The system will respond with:

6. **Remove the floppy disk by pressing the Eject button at the lower right corner of the drive, then turn the system power off.**

Please Note: Be sure to store the software disk in a cool, dry place, and make sure you will be able to find it if you need to!

7. **Turn RADAR's power back on, then confirm proper system operation.**

Please Note: If any problems are encountered during this procedure, contact Otari technical support for assistance.

A.5.2 SOFTWARE UPGRADE INSTALLATION PROCEDURE

RADAR provides a software upgrade installation method directly from the system menu. To use this method:

1. **BACK UP any current audio projects to 8mm tape.** This tape back up is

just a precaution - software upgrade installation should not change existing audio in any way.

2.   **Press MENU/ESC (front panel) or MENU/PREV (RE-8) to display RADAR's main menu:**

3.   **Select the System Menu, then press ENTER. From the submenus, select Upgrade System:**

4.   **Press ENTER.** The system will respond with:

5.   **Use the cursor up/down buttons (or the YES/NO buttons on the front panel) to select YES or NO, then press ENTER.** If you selected YES, the system responds with:

        followed by...

6.   **Shut down RADAR, if not already off. Insert the floppy disk containing RADAR software into the floppy disk drive, then turn the system on.** *Continue from Step 2 in the installation procedure provided in §A.5.1.*

This section describes RADAR's on-board Diagnostics utilities, which provide a variety of functions for fast troubleshooting of system difficulties, etc.

This section includes the following subsections.

B.1 GENERAL

This section describes RADAR's extensive Diagnostics software, which is included in the standard software delivered with each system.

Using the built-in Diagnostics, RADAR users can

❏   Troubleshoot SCSI bus problems
❏   Configure disk hardware
❏   Diagnose/repair hard disk problems
❏   Test the system display, and
❏   Log/review system errors encountered during operation.
❏   Contact Otari Technical Support using RADAR's Remote Modem Diagnostics features, which enables remote monitoring/diagnostics for isolating and solving system problems.

Diagnostics features are available through the Diagnostics menu, and may be used from either the Front Panel or the RE-8 Session Controller.

▼ IMPORTANT NOTES ▲

RADAR's Diagnostics should be run only under the supervision and/or direction of Otari technical support personnel! Serious loss of data and system downtime may result if the Diagnostics software is misused!

RADAR's Remote Modem Diagnostics software is included as standard. However, users who wish to utilize the feature must provide an appropriate external modem. *Systems without the RE-8 Session Controller option cannot use Remote Modem Diagnostics!*

B.1.1 Diagnostics Introduction

RADAR is a robust, reliable product, with years of development behind it to make it's hardware and software rugged enough for strenuous daily studio use. However, problems can happen now and again, and it's important to have a good set of tools on hand. RADAR's Diagnostics utilities provide the field technician with a battery of tests to troubleshoot system problems, as well as the software tools necessary to fix any problems uncovered.

These tools are powerful– therefore, we must recommend that NONE of these tests be performed without the advice and counsel of Otari technical support or authorized service personnel

We also recommend that before you proceed, you have any audio and project data backed up on tape. (If this is not possible due to a problem, PLEASE ADVISE TECHNICAL SUPPORT before proceeding!!!)

B.1.2   Diagnostics Utilities Operational Overview

RADAR's diagnostics are available through the Diagnostics menu, from either the RE-8 or the Front Panel. These menus appear in the following hierarchy:
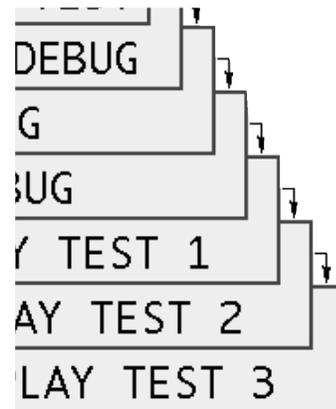
RADAR's diagnostics utilities divide into several functional groups:

1.   SCSI Bus diagnostics
2.   RADAR File System diagnostics
3.   Hard Disk troubleshooting
4.   System RAM testing
5.   Meters Display diagnostics
6.   Error logging/review utilities
7.   "Debug" view and logging to floppy disk.

B.2 RADAR DIAGNOSTICS OPERATION

B.2.1 Scan SCSI Bus

This item scans RADAR's SCSI bus for SCSI devices, then posts them to the LCD, where you may scroll through them to read device names and SCSI ID numbers.

When should you scan the SCSI Bus??

You should scan the SCSI bus when you install a new device, or when you suspect a problem with the SCSI hardware. Such a problem would be related to a set of eight tracks, e.g. the system unexpectedly drops out of record when there is still disk space.

Or, if the problem is backup related, you may wish to scan the SCSI bus to be sure that RADAR's CPU detects the tape drive.

1.   **Press the MENU/PREV (RE-8) or MENU/ESC (Front Panel) button.**

2.   **Scroll UP/DOWN through the choices until the DIAGNOSTICS menu item is displayed.**

3.   **Press ENTER (RE-8) or STOP/ENTER (Front Panel).**

4.   Scroll through the submenus until the SCAN SCSI BUS item is displayed:

5.   **Press ENTER.** The system will respond with:

After scanning the bus for all attached devices (this takes a few moments), the system displays information about the first item it finds, as shown:

6. **Use the cursor up/down keys (or the Jog wheel) to scroll through the other devices found in the SCSI scan.** A typical RADAR installation may have three internal disk drives, plus one tape drive, as shown in the example below. *Remember that SCSI ID #7 is always reserved for the CPU.*

7. **Press ENTER or Cancel to exit.**

Please Note: If the system remains with the "+SCANNING+" message, or displays erroneous results (such as "No Device 0" when it actually is installed), check for a SCSI ID number conflict on the bus. ***If you just installed a disk drive, or recently connected a tape drive, double-check the ID number assigned to the device! If there is a SCSI ID number conflict, the system may boot normally, but not function correctly.***

B.2.2 Mount / Unmount Operating System

This item mounts and unmounts RADAR's operating system - this function should only be used under the direction of Otari Technical Support!

"To mount a file" is a term that has come forward from the earliest days of the computer age. Originally, "Mount" meant to thread a computer tape (of the open-reel variety) and make its data available to the computer's central processor. In RADAR, "mounting the operating system" means the same thing: you are making the software and audio available to the CPU.

When should I mount or unmount the operating system?

You must unmount the file system before disconnecting external SCSI devices (prior to moving them to a backup station, for example.)

Unmount Operating System Procedure:

1.   **Press the MENU/PREV (RE-8) or MENU/ESC (Front Panel) button.**

2.   **Scroll UP/DOWN through the choices until the DIAGNOSTICS menu item is displayed.**

3.   **Press ENTER (RE-8) or STOP/ENTER (Front Panel).**

4.   Scroll through the submenus until the MOUNT / UNMOUNT item is displayed:

5.   **To continue with MOUNT or UNMOUNT, press ENTER.** The system will respond with:

6.   **Use the cursor left/right keys to select UNMOUNT, then press ENTER.** The system will begin the unmounting process, and will display:

This message will remain for a few moments. When the process has finished, the system will display:

7.   **Press a key to continue.** The system will respond with

Mounting Operating System Procedure

1.   **Press the MENU/PREV (RE-8) or MENU/ESC (Front Panel) button.**

2.   **Scroll UP/DOWN through the choices until the DIAGNOSTICS menu item is displayed.**

3.   **Press ENTER (RE-8) or STOP/ENTER (Front Panel).**

4.   Scroll through the submenus until the MOUNT / UNMOUNT item is displayed:

5.   **To continue with MOUNT or UNMOUNT, press ENTER.** The system will respond with:

6.   **Use the cursor left/right keys to select MOUNT, then press ENTER.**
         The system will begin the unmounting process, and will display:

This message will remain for a few moments. During this time, several other messages may appear on the second line of the LCD display, i.e. CONVERTING PROJECTS and/or RECLAIMING SPACE. *These messages are a normal part of the file system mounting procedure.*

 When the process has finished, the system will display:

7.   **Press a key.** The system then returns to its regular operating display.

B.2.3 Disk Diagnostics (INIT DISK, CHECK DISK, REPAIR DISK)

These menu items are used when diagnosing and repairing SCSI disk problems.

Please Note: The operating system must be "unmounted" (described in §B.2.2) before Disk Diagnostics can be run.

WHEN and WHY SHOULD I USE DISK DIAGNOSTICS?

You must use Disk Diagnostics when adding disk drives to a system - these must be INITed before use. Besides that, Disk Diagnostics is helpful during problem situations as described below. During operation, you would notice a disk problem if, for example, one disk's worth of tracks (let's say, tracks 9 through 16) was behaving oddly.

•   Perhaps you can play back from those tracks, but you cannot record.

•   Or, you see that you have plenty of disk time available, but when you attempt to record on any of those tracks, the time available drops to 000.

•   Or, you try to copy data to or from the disk, or do a restore from tape, but the disk fails to record.

Could this be a hardware problem? Maybe. Re-boot the system, and see if the problem goes away.

Could these problems be an Operating System problem in disguise? Perhaps, and it's simple to rule out an operating system problem. Simply perform the unmount/mount procedures in the previous paragraph, then re-boot the system.

"Soft" Disk Errors

Any of the above problems may be caused by a "soft" disk error, and Disk Diagnostics are useful for field-troubleshooting these problems. *A so-called "Soft" error is a problem with the data written on the disk, and not an actual physical problem. (Such an error could, for example, occur if RADAR's power is turned off at a critical time, when the CPU is in the middle of writing data to the disks.)*

If a soft error occurs in critical data, then RADAR cannot write further data there; and while the system is self-correcting as much as possible, there are problems that it is not prepared to deal with. RADAR's Disk Diagnostic routines can CHECK a disk for trouble, REPAIR any soft error problem(s) that are detected, and/or REMOVE the formatting entirely (along with the problem) and replace it.

Please Note: The order that the disk diagnostics appears in the Diagnostics menu hierarchy does NOT indicate the order in which they should be used! Otari Technical Support can advise as to the order of use; which is normally CHECK, REPAIR, then (if necessary) INIT.

B.2.3.1 CHECK DISK Operation

CHECK DISK scans the disk(s) for soft errors, then displays the number of errors encountered.

WHEN and WHY should I use CHECK DISK?

CHECK DISK is called for when you feel you may have something like one of the problems described above. Remember that these problems are usually associated with ONE disk, and not ALL disks in the system; and neither a reboot nor the unmount/remount of the file system has corrected the problem.

CHECK DISK Procedure:

1.   **Unmount RADAR's Operating System (described in §B.2.2), if you have not already done so.**

2.   **From the Diagnostics menu, select "CHECK DISK" item.** The system will respond with:

3.   **Use the cursor up/down keys (or the Jog wheel) to select the desired disk to check, then press ENTER.** The system will respond with:

4.   **Select YES to continue** (or NO to abort), **then press ENTER.** The system will display a +CHECKING+ message, followed by a report:

Please Note: If no errors were encountered during the check, and you have already tried to unmount and mount the file system, you should attempt to re-install the SAME VERSION operating system software from the floppy disk supplied by Otari. (This is helpful in ruling out a software file system problem.) If this does not repair the problem, contact Otari Technical Support.

5.   Errors found during CHECK DISK are shown as a total number. These errors are divided into categories, which are helpful to Otari Technical Support. **Use the cursor UP key to scroll through these categories:**

- **OTHER:**   *###*
- **XLINK:**   *###*
- **TRUNC:**   *###*
- **STRAY:**   *###*
- **TOTAL:**   *###*

Be sure to record these numbers for future use.

Please Note: If there are errors encountered during the test, proceed to REPAIR DISK (§B.2.3.2).

B.2.3.2 REPAIR DISK Operation

REPAIR DISK attempts to correct soft disk errors on the selected disk, to restore it to normal operation.

WHEN and WHY should I use REPAIR DISK?

REPAIR DISK is called for when a CHECK DISK test has encountered errors. Please remember that REPAIR DISK cannot fix a disk hardware problem, but only certain kinds of repairable problems.

CAUTION! While REPAIR DISK is not normally destructive to audio data, you should get any important audio off the system onto other media before proceeding.

REPAIR DISK Procedure

1.   **Unmount RADAR's Operating System (described in §B.2.2), if you have not already done so.**

2.   **From the Diagnostics menu, select "REPAIR DISK" item.** The system will respond with:

3. **Use the cursor up/down keys (or the Jog wheel) to select the desired disk to check, then press ENTER.** The system will respond with:

4. **Select YES to continue** (or NO to abort), **then press ENTER.** The system will display a +REPAIRING+ message, followed by a report:

5. Errors found during REPAIR DISK are shown as a total number. These errors are divided into categories, which are helpful to Otari Technical Support. **Use the cursor UP key to scroll through these categories:**

   - **OTHER:**   *###*
   - **XLINK:**   *###*
   - **TRUNC:**   *###*
   - **STRAY:**   *###*
   - **TOTAL:**   *###*

   Be sure to record these numbers for future use.

B.2.3.3 INIT DISK Operation

CAUTION! INIT DISK is destructive to both the audio data on the disk and the file system - therefore it should only be used under direction of Otari Technical Support!

WHEN is INIT DISK effective?

INIT DISK removes the operating system and formatting information from the selected disk. This action is sometimes necessary if the disk has soft errors that cannot be repaired with RADAR's Repair Disk procedure. **<u>This action is also necessary when installing new SCSI disks into RADAR.</u>**

INIT DISK also removes all audio from the disk, and all project information. This information is not recoverable!

INIT DISK Procedure

1. **Unmount RADAR's Operating System (described in §B.2.2), if you have not already done so.**

2. **From the Diagnostics menu, select "CHECK DISK" item.** The system will respond with:

3. **Use the cursor up/down keys (or the Jog wheel) to select the desired disk to check, then press ENTER.** The system will respond with:

4. **Press ENTER to continue (or select NO to abort.)** The system processes for a moment, then responds with a confirmation:

CAUTION: If you proceed with this operation, all audio and project data will be erased from the disk. You will then need to re-install RADAR's operating software from floppy disk.

5. **To abort the operation, select NO, then press ENTER. To proceed, select YES, then press ENTER.** The system responds with:

and then finally,

6.   **Press any button to continue.** Proceed to re-mounting the file system as described in §B.2.2.

Please Note: After an INIT of Disk 0, the system must have software re-installed from floppy disk. If you cycle power without the boot disk, the system responds with:

Refer to the software upgrade/installation information in Appendix A for assistance if necessary.

B.2.4 Copy Hard Disks

This feature enables you to copy the contents of up to three SCSI disks (24 tracks of audio) to up to three other disks on the SCSI chain. This feature enables you to upload or download the contents of the internal disk drives from/to three drives in an external drive bay.

IMPORTANT!

When performing a Copy Disks operation, any audio that exists on the target drive(s) will be PERMANENTLY erased. This operation CANNOT be undone!

Please Note: You must UNMOUNT the disk's file system before attempting the copy operation.

To perform a Copy Disks operation, select the item from the Diagnostics menu. The system will scan the local SCSI bus, and will respond with:

Use the cursor keys to enter the desired parameters, then press ENTER to begin the copy operation. The system will prompt you for confirmation.

Please Note: A 1GB disk takes between 8 and 10 minutes to copy.

B.2.5 Show Free RAM

This menu item displays the amount of free RAM available on RADAR.

Why show free RAM?

If there is a problem with the RAM allocation on the system, or a problem with the RAM hardware, this test will probably pick it up; this information may be helpful to Otari Technical Support when troubleshooting.

If you select this this item from the Diagnostics menu, the system responds with:

The amount of Free RAM will depend on the size requirements of the current version of software and the amount of active project information on the system, so it is impossible to provide a guideline here. However, any unaccountable decrease (or increase!) in this number is suspicious.

The number of regions has to do with the current project activity on the system.

B.2.6 Error Logging (Check Project, Realtime Errors)

Two error logging modes are provided:

–   CHECK PROJECT
–   REALTIME ERRORS

Information from these modes may be useful to Otari Technical Support when troubleshooting.

B.2.6.1 Check Project

These errors indicate an overall number of errors detected in the system's current projects (playlists), and also break the errors down on a track-by-track basis.

Check Project/Playlist Error Readout procedure

1.   **Select Check Project from the Diagnostics menu.** The system will prompt you to select the desired project by number, then will perform a check of the current project. Finally, if the project is OK, the system will respond with:

2.   **If there are any errors detected (i.e. "Overall" does not say "OK"), use the cursor UP/DOWN keys to scroll through the tracks on the system -** *attempt to isolate errors to a particular track or set of tracks.*

B.2.6.2 Real Time Errors

This diagnostic detects problems with the system in operation, and logs the errors encountered.

Real Time Errors readout procedure

1.   **Select the REALTIME errors item from the Diagnostics menu.** The system will respond with:

2.   **If the total is greater than zero, use the cursor up/down keys to scroll through the error source breakdowns.** These items are:

   - ASSERT errors
   - 386 errors (actually, all RADAR CPU's are now 486's)
   - RECORD errors
   - PLAY errors
   - WRITE errors (WRITE C, WRITE B, WRITE A)
   - READ errors (READ C, READ B, READ A)
   - TOTAL errors

B.2.7 MIDI IN/OUT TEST

This diagnostic tests the proper operation of the MIDI IN/OUT ports of RADAR.

B.2.8 DEBUG MODES

B.2.8.1 Configure Debug

Please Note: This information is provided for users who have a debug monitor setup available to be installed in their RADAR system.

Why use CONFIGURE DEBUG?

RADAR's software provides drivers for an optional Debug monitor card, which can be installed into one of the motherboard card slots. Connected to a VGA monitor, RADAR's debug driver provides many diagnostic readouts including CPU and SCSI activity, Debug setup is provided through the Diagnostics menu to select which system parameters are displayed on the monitor.

Configure Debug Procedure

1. **Select the Configure Debug item from the Diagnostics menu.** The system will respond with these default values:

2. **Use the cursor left/right keys to move between these four items; use cursor up and down to make choices to see System information, SCSI information, and/or Sync information.** The buffer size (BUF:030) describes the amount of space devoted to a "capture" buffer for message and error logging.

Please Note: SYSTEM is an overall configuration value - If this is set to N, no debug messages of any kind will be logged. If set to Y, messages are logged. The SCSI and SYNC debug messages are only logged if SYSTEM is set to Y.

B.2.8.2 Show Debug *(Messages on LCD)*

As RADAR operates, it records its various internal status messages into the buffer described above. The Show Debug item allows you to view the contents of this buffer - text messages describing RADAR's recent activity - without requiring an external DEBUG monitor setup. If your system is not functioning properly,. check these messages, and record them for Otari technical support.

Show DEBUG operation

1. **Select SHOW DEBUG from the Diagnostics menu.** The system responds with the two most recent internal text messages:

2. RADAR's LCD display only provides two lines of 16 characters each; however the messages are of variable length. **Use the cursor left/right keys to move horizontally to read the messages in their entirety, and use cursor up/down to move vertically through the list, as shown:**

```
CTL: SetCrystalFreq: 0000bb80
CTL: SetCrystalFreq: 0000bb80
CTL: XfadeTime: 00000005
CTL: Cue: 04000000
┌─────────────────────────────────┐
│ CTL: No system c│onversion required.
│ DLG: System diag│nostics: OK
└─────────────────────────────────┘
        Scroll horizontally with cursor L/R
```

Scroll vertically with cursor up/down
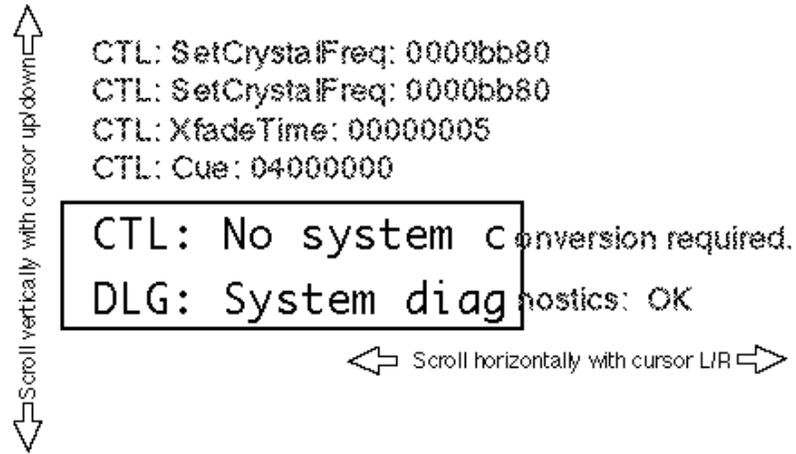
3. **Record any error messages that are recurrent; report these to Otari Technical Support.**

B.2.8.3 Save DEBUG

RADAR enables you to save the contents of the capture buffer to a DOS-formatted floppy disk, for later use by technical support personnel. This data is written to a text file for later review using any text-processor software.

Save DEBUG Procedure

1. **Insert a DOS-formatted floppy disk into RADAR's floppy drive.** *(Make sure the disk is not write-protected!*

2. **Select the SAVE DEBUG item from the Diagnostics menu.** The system responds with:

3. The system uses "DEBUG.OUT" as a default file name - you may change this if desired. **Press ENTER to continue.**

The file is then written to the formatted floppy disk in the drive. If no disk is present, or the disk is write-protected, the system will state:

B.3 RECOVER SPACE

This feature enables increased recording efficiency by recovering unused disk space for use as "fresh" audio recording space. You may set a bottom limit to the length of any blank area that will be recovered.

To perform a Recover Space operation, select the item from the Diagnostics menu. The system will respond with:

With this (default) setting, any silent audio section in any project(s) that is longer than 2 seconds will be "recovered" as free space

Set the desired lower limit, then press ENTER. The system will prompt you for confirmation before performing the recovery.

B.4 REMOTE MODEM DIAGNOSTICS

For fast/accurate field troubleshooting, RADAR provides a Remote Modem Diagnostic feature, which enables Otari technical support personnel to "dial up" the RADAR system in your studio, and perform diagnostics tests and monitor the system for proper operation.

Please Note: The software for Remote RADAR Diagnostics is provided standard with the system. However, to utilize the feature you must provide a standard V.32 or V.34 (14.4 kbps or 28.8 kbps) EXTERNAL modem.

B.4.1 About Modems...

CAVEAT EMPTOR!

Noisy phone lines and fate can cause problems with the less-expensive (cheaper) external modems. We have found, through our own painful experience, that you get what you pay for. *Contact OTARI Technical Support for advice on obtaining one of the better modems.*

B.4.2 Modem Hookup

The modem connects to RADAR's RE-8 Mouse Port using a 9-pin cable (pin-to-pin wiring). This cable is the same as a standard RE-8 cable!

If you operate with a long RE-8 cable (greater than 10 feet) you may experience difficulty in communicating with the modem. Switch to a shorter RE-8 cable (sub-6 feet) if you encounter problems.

B.4.3 Modem Menu Operation

The Modem Menu (available under the Diagnostics menu) provides a means for controlling the modem, dialing out, hanging up, etc. The menu is organized as shown:

B.4.3.1 Answer Modem

To set the modem to wait for a call (probably under the advice of Otari Technical Support) select this menu item. The system will respond with:

B.4.3.2 Dial Modem

To dial out from your system (i.e. dialing into a remote system to be detected/diagnosed), select this item. The system will respond with:

Use the numeric keys to enter the desired phone number, then select ENTER to begin dialing.

When the remote system picks up and the two systems establish communication, the dialing system then becomes the master controller - almost as if a second RE-8 has been plugged into the remote system.

Please Note: The remote system's RE-8 and front panel buttons are still operational while the system is connected for remote diagnostics.

B.4.3.3 Hang Up Modem

This menu item will hang up the phone line and reset the modem. You are prompted for confirmation before the hang-up occurs.

B.4.3.4 Configure Modem

This menu item configures several standard modem parameters, such as speed, initialization string, parity/stop bits, etc.

B.4.3.5 Reverse Answer

This feature works the same way as ANSWER MODEM, except the answering system becomes the controlling system instead of the dialing system.

B.4.3.6 Reverse Dial

This feature works the same way as DIAL MODEM, except the dialing system becomes the controlled system instead of the answering system.

B.4.3.7 Save Modem Debug

This feature is only used by Otari technical support.

B.5 DISPLAY TESTING

Three Display Tests are provided to challenge your system and your skill, and are 100% self-explanatory. *The display tests are an important part of RADAR's functionality, and should be run periodically*

The Display Tests are also available during BACKUP and RESTORE operations.

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Appendix D   RADARLINK Operation

This section describes the RADARLINK feature, which enables several RADAR systems to be slaved for large-format digital multitrack applications. This section includes the following subsections:

D.1 GENERAL

RADARLINK enables multiple RADAR systems to be linked together and be controlled from a Master RADAR (with an RE-8 Session Controller). The Slave RADAR systems are locked together with the same Sample Clock as the Master RADAR.

RADARLINK utilizes a serial communication protocol to connect multiple RADAR systems together with sample accuracy, so they essentially function as a single unit.

A RADARLINK setup includes one Master and up to seven Slave units, which may all be addressed from a single RE-8 Session Controller.

IMPORTANT NOTE!

Early production units (with serial numbers below **7950421429**) will require a new MF3 communications card to enable RADARLINK support. PLEASE NOTE! If you are running a single RADAR system which falls below the revision level noted above, it is NOT necessary for you to have your MF3 card modified! If, however, you would like to use the RADARLINK feature, then contact your Otari dealer for upgrade information.

D.2 RADARLINK SETUP

Before RADARLINK can be used, the units must be connected together, and each unit must be configured by assigning it a unique Slave ID number.

D.2.1 Electrical Connection

RADARLINK hookup uses standard 9-pin (straight pin-to-pin) cables, which are available at most computer stores.

Please Note: Select cabling so that the entire length of the cables between systems is less than 30 feet (10m).

Connect the unit(s) together from their RADARLINK OUT connector to the RADARLINK IN on the next system, etc. *(These connectors are located at the rear of the system, just above the Grounding lugs.)*

Please Note: If the Master and Slave unit(s) do not all have the modified MF3 board (described above), then RADARLINK will not be able to establish communications. Contact Otari Technical Support!

D.2.2 Software Versions...

ALL units in a RADARLINKed configuration MUST be running the same version of system software! If any units need to be upgraded, you will be prompted and RADARLINK will not be established.

D.3 RADARLINK ENABLE/DISABLE (RE-8: "L")

Please Note: The RADARLINK setup items are available on the SYSTEM menu.

RADARLINK is selected by pressing the LINK button ("L" on the RE-8 keyboard, or by selecting the RADARLINK ENABLE? menu item from the System menu. The RADAR unit on which this selection is made is configured as the MASTER; this may be any unit in the system. The MASTER unit is assigned an ID of "M", and this is displayed at the upper-right corner of the LCD window.

The RADARLINK enable/disable menu item is provided to enable RADARLINK operation, permitting multiple slaved RADAR systems to be controlled from one location. (The "L" key on the RE-8 also access this function.) Upon selecting this function, the menu will prompt you with:

If you select YES, the system will prompt you with:

A unique ID number is then assigned automatically to the other systems in the RADARLINK chain. In rare circumstances, a duplicate ID number will be assigned. If this occurs, that system will display a message:

DUPLICATE ID
SELECT NEW ID:

Select a new ID using the cursor up/down keys. (Valid ID numbers are 1 - 7.) The new ID is stored, and used the next time RADARLINK is enabled.

Please Note: RADARLINK ID can also be changed via the Preferences menu (§4.3.4.14) any time RADARLINK is disabled.

When valid configurations have been selected, the Master RADAR defaults to "BROADCAST" mode (see below). RADARLINK is now configured for use.

To disable RADARLINK re-select the RADARLINK item, and select Cancel.

From the RE-8: To disable RADARLINK, press "L" again.

Please Note: When RADARLINK is enabled, all user interface actions on Slave units are ignored, with the following exception: When the ESCAPE or CANCEL button is pressed on a Slave unit, the unit will display a message: CANCEL RADARLINK? Y/N, allowing the user to unilaterally disarm RADARLINK. *This escape routine is useful if the RADARLINK hardware connection is broken.*

D.4 RADARLINK OPERATING MODES

D.4.1 Broadcast Mode

Please Note: Broadcast Mode is the default mode when RADARLINK is first configured.

In Broadcast Mode, commands are broadcast from the Master RADAR to all Slave units, and executed on each unit simultaneously. When the mode is engaged, the Master unit forces all Slave devices to agree with its settings of system-wide parameters including:

- Sample Rate
- Varispeed (on/off and value)
- SMPTE Rate
- Crossfade Time
- Pre/Post Roll Time
- Auto-Input, Auto-Play, Auto-Punch, Cycle, Record Safe
- System Preferences, Time/Date
- Project Number
- Locate Points and Labels

IMPORTANT!

If RADARLINK has just been enabled, all Slaves will be cued to the same time location as the Master. If the selection of Broadcast Mode follows an operation in Solo Mode (see below), all Slaves will be cued to the same location as the most

recently soloed unit.

D.4.1.1 Project Numbers Must Match

In RADAR's Broadcast Mode, all units will be set to the same Project Number at all times. If audio for a multi-unit project is originally stored in different Project Number locations, the Projects must first be renumbered to match, using the RENUMBER PROJECT menu item found in the Project Menu (§4.3.2.7).

A real-world example of this might be if you are working on Project 10 on your Master RADAR and you had the corresponding audio for your second (Slave) machine on an Exabyte tape which you just restored to your slave machine. Assuming that all projects on this slave machine were deleted before the restore, the restore operation put the audio at Project 1. If you now enter RADARLINK from the Master unit, this slave will play back nothing because it had no Project 10. Therefore, you must exit from RADARLINK, renumber the slave unit's project to match the Master unit (or vice versa), and re-enter RADARLINK; the project should operate correctly after this.

D.4.1.2 Operations Available during Broadcast Mode

In Broadcast Mode, the following operations are functional:

- Transport Controls
- Cue (including recall location, enter time, +/-, play to/from/between marks
- Synchronization (see info on Sync, below)
- Jog/shuttle
- "All Tracks" Edits (see description below)
- Changing Parameters (as listed in §D.4.1)

All these controls and operations function as if they were controlling a single RADAR, performing the same function on all units in a RADARLINKed system.

Please Note: All functions not listed above operate as if Solo Mode (see below) was selected for the Master.

D.4.1.3 Synchronization

Keeping in mind that RADARLINK enables you to operate multiple devices as if they were a single unit, syncing a RADARLINKed system to SMPTE or MTC requires that you make the appropriate time code inputs to the Master RADAR unit. *Remember that the Slave unit(s) are locking to the timing information provided by the Master unit!*

For example, if you want to slave your RADARLINKed system to a VTR (which is the SMPTE source) you would connect this VTR's time code output to the Master RADAR's SMPTE input. You would then set the Master RADAR to SMPTE sync, and this unit will then force the slave(s) to chase lock to the VTR.

IMPORTANT

You must configure the Master RADAR unit to the "SLOW LOCK" setting (found under the SMPTE LOCK SPEED item in the Project menu) for SMPTE or MTC chaselock to work properly and reliably. If you have this set to FAST LOCK, you may encounter a situation in which the RADRLINKed machines get out of sync with one another after repeated back-and-forth shuttles. *If this problem occurs, simply set the Master RADAR unit to SLOW LOCK, exit RADARLINK, and re-enter.*

Please Note: If you send SMPTE and/or MTC to other devices (such as console automation or a MIDI sequencer) this connection must be made from the Master RADAR.

D.4.1.4 "All Tracks" Edits

"All Tracks" edits simply refer to edit operations which affect all tracks of the RADARLINKed system. In Broadcast Mode, Mark In and Mark Out points highlight an edit region for all tracks on all systems in the chain. If you then select an edit function (e.g. cut, copy, paste, etc.) you need to choose "ALL TRACKS" when the LCD prompt (asking what tracks you would like to edit on) is displayed. The edit operation is then carried out across all tracks in the "extended" system.

Please Note: Undo/Redo functions operate across all machines in a RADARLINK configuration.

If you must edit material on selected tracks on either the Master or Slave(s), you must enter Solo Mode (below) to perform the edit operation.

D.4.2 Solo Mode

Solo Mode allows you to select any single RADAR system in the chain and operate it independently from the other units.

Solo Mode is selected by pressing the Machine Solo button ("S" on the RE-8 keyboard) followed by the *numeric keypad* ID number of the RADAR you want to solo (or "M" if it is the Master).

D.4.2.1 RADARLINK SOLO Mode via System Menu

The System menu provides a RADARLINK Solo menu item, which provides the ability to place an individual RADAR system into "solo" mode, enabling the Master controller to control just that system. If selected, the system will respond with:

Use the cursor up/down keys or the RE-8's jog wheel to scroll through the available RADARLINKed systems; press ENTER to select the desired system to SOLO.

To exit from RADARLINK SOLO mode, re-select the RADARLINK ENABLE item to return to Broadcast Mode.

During Solo operation, the ID number of the Soloed unit is displayed (flashing) at the upper right corner of the LCD window.

In Solo mode, the RADAR unit which is being Soloed is controlled by the Master's RE-8 as though it was connected directly to it, and RADARLINK was not active. Therefore, all standard RE-8 functions are available, and affect just the soloed system. This includes those functions operational in Broadcast mode, such as transport controls (i.e. pressing PLAY will play just the SOLOed system).

The following functions operate only in SOLO mode:

- Track Arm & Solo (see below)
- Individual track edit operations
- Disk functions (diagnostics operation, upgrade system, reclaim space)
- Backup/Restore
- Digital I/O

D.4.2.2 Track Arm & Solo

As an example of Track Arm & Solo, if you have two RADAR units in a RADARLINK configuration and you arm tracks or solo tracks from the RE-8 (from Broadcast Mode), you will only be affecting the tracks on the Master unit. If you need to arm or solo tracks on the Slave unit in addition to those armed or soloed on the Master unit, you will need to enter RADARLINK SOLO mode for the desired Slave unit.

After enabling the Solo function you may now arm or solo the desired track(s). The LED indicators for track arm and solo work on the Soloed unit just as they normally would and when you re-enter Broadcast mode, the tracks armed or soloed on the Slave unit(s) will be blinking to indicate the correct track(s).

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