Rauland

TC4411 CPU3 for Telecenter® IV Plus
Installation, Programming, and Media Operation

RAULAND-BORG CORPORATION • 3450 West Oakton Street, Skokie, Illinois 60076-2951 • (708) 679-0900

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Introduction

Description

This new Central Processing Unit, the *CPU3*, has a faster processor and more memory than the *CPU2*. These enhancements enable it to support the additional functions described in this manual.

The software for this *CPU3* will bear "200" Series numbers; that for the standard board, *CPU2*, "100" Series numbers.

Upgrading to the TCIV Plus System

Replacing a CPU2 with a CPU3 will upgrade a standard Telecenter® IV system to an enhanced Telecenter IV Plus system.

Copying the Existing Programming

The *CPU3* will accept the same user programming as the *CPU2*. Thus, you can copy the EEPROM settings (Architectural Numbers, Attributes, Location Codes) from the CPU2 to the *CPU3's* EEPROM. You will have to add programming for any new features you intend to use (e.g.,

Media Retrieval). If you want to copy the old user programming, do so before removing the CPU2 from the system (see the "*TCPU3* Diagnostic Program," further on).

Note: The *T6* Diagnostic Program works only with the *CPU2*, and the *TCPU3* Program works with the CPU3. The two programs are sold together on the current diagnostic disk. To make it clear which program is used with which CPU, the *T6* program has been renamed the *TCPU2* but is otherwise unchanged.

Installing the CPU3

The CPU3 is simple to install:

Step 1. Turn off all power to the system.

Step 2. Remove the front panel and the front locking bar inside. Unlock the flat-cable connector from the CPU2 by spreading apart its plastic "jaws." Pull off the flat cable and any other connector, then remove the board.

Step 3. Insert the CPU3 into the CPU slot in the main chassis, push on the connectors you removed from the *CPU2*, and lock the flat-cable connector's plastic "jaws." Replace the locking bar and the dress panel.

Media Retrieval

Overview

IL0342 on the next page shows the major components of the media retrieval function. The viewer uses a dialing Telecenter phone to "call" a particular MRlOO module. Once connected, the user presses the phone keys to control the associated video player; for example, pressing a "2" will cause a player to start running a program. The player then sends its output to the user's television receiver via an MATV cable (Master Antenna distribution system for Television).

In effect, the phone keypad becomes a very remote control. Thus, instead of carting players about, an institution can mount them all in a secure room, such as a Media Center.

Access to the media lines can be restricted. Each Dialing Staff Phone (see below) can be given or denied the power to directly gain control of the video players. All Administrative phones automatically have direct access to the players, and all display phones have the added power of assigning any media line to any dialing phone, and of reassigning control at any time.

Instructions for installing the MRlOO module and the MR200 chassis are in KI-1638. This section tells how to program the media lines, establish a media-center line to supervise them, and control a video player from a Telecenter phone. Refer also to the "Overview" illustration on page 3 and the "Programming Summary" on page 4.

Note: The DSP (Dialing Staff Phone) line is covered in its own section of this manual, because it entails far more than Media Retrieval.

MRlOO ROM Versions

Important: The keypad layouts described in this manual are supplied by MR100 modules with Version 6 or later ROMs. The earlier ROMs supply different layouts, especially for the laser function mode.

Media Line

A media line is a modified LLM line connected to an MRlOO module (see KI-1638 for the installation of a special E & M hybrid, supplied with each MR100). It conveys standard DTMF tones (sent from the user's phone) to an MRlOO module. The module, in turn, trans-

Room TV Set

Video Players

MATV Cable

Control Cables from **MR100** Modules

Room Phone

MR100 Modules in
MR200 Chassis

TC Media **(A:4)** Line

DSP **(A:24)** or TC Admin. (A:I) Line

Rauland *TELECENTER*®
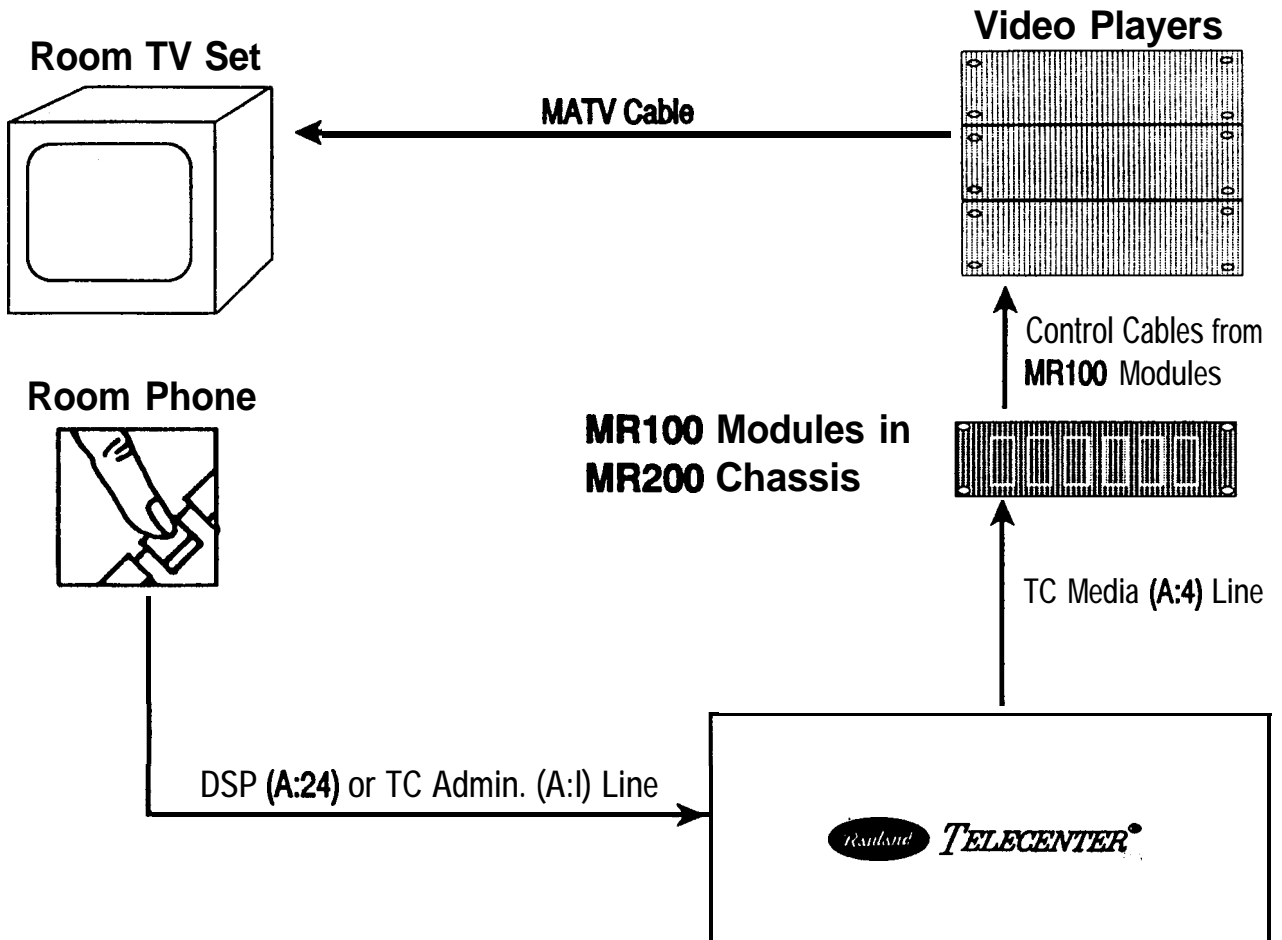
T*ELECENTER*® *IV PLUS* **System:**
Overview of Media Retrieval

IL0342 $\boxed{0}$

Lines: ## Attributes: ## Location Codes:

DSP
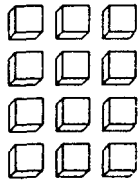
A: 24 (DSP line)
B: **56***
B: **7*** (direct access to
   media lines)

1.65390 (Attribute Set 1)
2.65392 (Attribute Set 2)
3.65394 (Attribute Set 3)
4. 65396 (Attribute Set *4)*

Media Center

`:127`
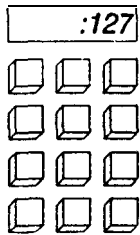
A: 1 (Administrative line)
B: **8*** (select Display 2)

65388 (hookflash by media
   user rings this Phys. No.)

MR1 00s

A: 4 (media line)
B: **12*** (select one set of
   Location Codes at right)

** Attributes marked with an asterisk
  may vary; see the text.*

1. 64274 (initializing tones)
   64276 (ending tones)

2. 64298 (initializing tones)
   64300 (ending tones)

3. 64302 (initializing tones)
   64304 (ending tones)

TELECENTER® *IV PLUS* System:
Programming for Media Retrieval

IL0343 `0`

lates these tones into commands that the associated video player can understand. There are only two types of programming for this line: selecting the line type, and entering optional automatic control signals.

Media-Line Type A:4

Program each MR100's line as "A:4." Turn off all the remaining "A" Attributes and "B" Attributes 3-8. Select the first two "B" Attributes according to the next subsection.

Automatic Setup Signals

Users prefer having a player "ready to go" when they first connect with its media line. The major responsibility for effecting this state of readiness will fall upon a staff member assigned to the media center. Among other things, this person will see to it that the players are turned on, loaded with the desired programs, and properly cued.

The Telecenter system offers an automatic way of supplementing this setup. You can program each media line to automatically receive one set of DTMF tones when a user first calls and assumes control of a player, and another set of DTMF tones when the user relinquishes control of it or the Media Center uses the #24 function to end a user's control. Neither set is sent when the Media Center uses #24 to assign a player to another phone, when a user hangs up without relinquishing control of the player, or that user subsequently calls the player back. Selecting the tones will depend primarily upon the type of player involved.

Laser-Disk Players: A representative example would be sending the initializing tones for zero (0) and asterisk (*). This will set the keypad to the function mode and put the image on the screen, so that the user can immediately begin operating the player or specify "frame" or "chapter" before entering its number. The need for this resetting arises from the standard way of releasing a laser-disk player, which is to enter the numeric mode and hang up.

VCRs: A representative ending tone would be sending a "5" to "stop" the player and a "1" to "rewind" the tape for the next user. A possible initializing tone would be sending a "2" to start playing the tape.

Programming the Signals: There are two steps to establishing these automatic signals: listing them in the appropriate Location Codes, and setting each media (A:4) line's first two "B" Attributes to select the Location Codes with the desired tones.

To accommodate different kinds of players, you can list three different sets of tones. Each set can consist of two parts: a group of initializing tones (sent when the user calls the line and gains control of the player) and a group of ending tones (sent when the user ends control of the player, by pressing "0" and hanging up).

The table at the top of the next column, describes the three sets. The "Sclcctor Attributes" column tells how to use a media line's "B" Attributes to select the desired pair of Location Codes. If you want only initializing or only ending tones in a set, simply leave that set's other Location Code blank (0).

The Telecenter system sends the tones in the order that they are listed in these Location Codes. The following formula shows how to compute the number to be stored at a Location Code to get a specific tone sequence:

Selecting Initializing and Ending Tones

Set	Location Code	Selector Attributes
1	64274 (initializing) 64276 (ending)	B: 1_
2	64298 (initializing) 64300 (ending)	B: 2
3	64302 (initializing) 64304 (ending)	B:12

Note: Omit B:1 and B:2 for no initializing tones.

formula shows how to compute the number to be stored at a Location Code to get a specific tone sequence:

$$number = Tone\ 1 + (Tone\ 2 \times 16) + (Tone\ 3 \times 256) + (Tone\ 4 \times 4096)$$

Obtain the numbers of the desired tones from the table below. Enter the tones in a Location Code in the order you want them sent. You can set a Location Code to "0" for no tones or program it for one tone to four tones.

Programming Codes for Phone Keys

DTMF Key	Programming Entry
N.A.	0[1]
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	10
*	11
#	12
N.A.	13[2]
N.A.	14[3]
N.A.	15[4]

[1]"Ignore further entries in this Location Code"-do not usc.
[2]"Busy signal"-do not use.
[3]"Dial tone"--do not use.
[4]"Quiet, no tone"-do not use.

Example: The following initializing tones would set up a laser player for a caller by setting the keypad to the function mode and showing a frame and its numbering on the screen: "0-*" (this combination assures that the keypad will be in the function mode) and "9" ("Show Frame and Chapter Numbers on the Screen"). To establish these as initializing tones at Location Code 64274, 64298, or 64302, enter "2490":

10 [0] + (16 x 11) [*] + (256 x 9) [9] =
10 + 176 + 2304 = 2490

Media-Center Phone

Any Administrative display phone can be used to supervise Media-Retrieval operations. This includes programming the system, reviewing the current users, and assigning or canceling the use of individual media lines.

Standard Arrangement: Ordinarily, an Administrative display phone in the Media Center will handle these functions. In this way, the person receiving media calls can respond to calls by attending to the video players (e.g., loading the desired program and checking on problems). The Media-Center line must be a standard Administrative line (A: 1) but requires no special attributes.

Optional Programming: It may prove helpful to program a Media-Center phone to receive calls from Display Driver 2, and use Display Driver 1 for the Administrative phones receiving non-media call-ins. Adding the A:7 Attribute would immediately connect someone calling the Media Center to an associated speaker.

Note: A TC4400 Call-Control Console is designed primarily for interconnect functions; it is not recommended for Media-Retrieval functions.

Location Code 65388: Entering the Physical Number of the Media Center's phone here enables anyone communicating with an MRlOO to call the Media Center immediately by flashing the hook switch, and to return directly to the MRlOO by hook-flashing again. This quick-transfer method can prove helpful when a user encounters difficulties, such as finding that the wrong tape or disk has been loaded. To disable this function, store a zero at this Location.

Caller ID: Starting with Version 204 system software, any display phone will show the number of another Telecenter phone that dialed it. The caller's number will appear on the right end of the display, in the "last-number-dialed" field. To indicate which number it is displaying, the system will put a colon (:) before the last number dialed (as usual) and a "greater-than" (>) sign before a caller's number.

Media-Related Operation

Most of the functions described here pertain to the user who "calls" an MRlOO and uses the telephone keypad to control the video player. The #24 supervisory function, for reviewing and changing users' connections to MRlOO lines, can only be used by Administrative display phones, and is especially intended for a Media-Center phone.

Controlling a Player

This section gives detailed instructions on controlling a video player from a telephone. IL0344, at the back of this manual, is an illustrated summary of these functions.

Establishing and Relinquishing Control

Note: If your DSP phone is not programmed to access a media line directly, call the Media Center to have the desired line assigned to your phone.

Optional Single-Digit Dialing: Telecenter systems with Version 204 or later software can provide singledigit access to a media line already assigned to your phone. You would originally gain control of a media line through dialing its full number or by having the Media Center assign it to your phone. Thereafter, until you released the media line, you could simply dial a single digit (e.g., "7"). and the system would look to see which media line is assigned to your phone and connect you to it.

Step 1. Tune the television monitor to the channel assigned to the desired video player.

Step 2. Use the room phone to dial the number of the desired player.

» The system will send a short beep when it has given you control of the player, and will continue to beep at one-second intervals.

(If someone else already has control, the system will send you a busy signal. If your phone is not authorized to call an MRlOO line, the system will send you a single, long "disallow" beep; in this case, call the Media Center to have the line assigned to your phone, then repeat Step 2.)

Step 3. After gaining control, use your telephone's keypad to operate the player (see the next subsection).

Step 4. To operate the keypad, keep the receiver off-hook. Once the player is running the program and you do not need to send any more control signals for a while, you can hang up.

» The player will continue running, and its media line will remain assigned to you, which means no one else can access it (unless the Media Center intervenes with the #24 function or an Administrative phone with a call-in attribute, B:7 or B:8, dials the line). Hanging up frees a Telecenter link for other functions and lets you receive or make other calls.

Step 5. To resume sending control signals, call that media line back from the same phone, as in Step 2. (In a system with version 204 or later software, you maybe able to dial a single digit, like "7," to reconnect with whichever media line you still control.)

Step 6. If you need to contact the Media Center while you are connected to the media line (e.g., because you need a different program or there is a malfunction), simply flash the hook switch (quickly press and release it).

⇒ You will be temporarily disconnected from the media line and will ring the Media Center line (or be connected to its associated speaker).

Note: If your system does not use this function, hang up as in Step 4, then call the Media Center; you will retain control of the player and be able to dial it back.

Step 7 . To end the connection with the Media Center telephone and return to the player, flash the hook switch.

Step 8. To relinquish control of a player, dial "0" and hang up.

Operating a Player

The **illustration at the end of this manual (IL0344) identifies the functions of the keypads. This section will explain those that are not self-evident and give some examples of typical operations. Because the control functions are flexible, you can many more things than can be described here.**

In general, the keypad commands parallel the layout of a typical remote control.

Which Laser-Disk Mode?

With a laser player, a picture indicates the function mode. The numerical mode always displays a blue screen; if the "Show Numbers" key has been selected, it will display numbers. However, the "Pause, Blank Screen" key (5) in the play mode also shows a blue screen. Pressing the "2" key should start the disk playing if the "freeze" function is engaged, but will have no visible effect if you are in the numerical mode.

VCR (Video Cassette Recorder) Commands

This mode uses the first six keys and "0." Some keys can work in combination with others. For example, "Fast Forward" (3) and "Fast Reverse" by themselves advance or rewind the tape rapidly without displaying a picture. Pushing either one while the tape is playing runs the picture rapidly on the screen in a "search" function.

Note: **The VCR model may affect some operational details; look for an instruction sheet from the Media Center or experiment with the keypad commands.**

Laser-Disk Commands

There are two laser-disk command sets. The numeric mode, discussed in the next paragraph, is for entering chapter and frame numbers, which are typically found on "educational" disks; other disks, like those containing motion pictures, may not have this numbering. The func-*tion mode,* **discussed on the next page, requires a key-by-key description.**

Laser Numeric Mode

On "educational" disks, each motion sequence has 30 frames per second of viewing time, and each frame can be shown as a still picturcor selected asastartingorstopping point. Some disks have "slides"-individual pictures recorded as a series of single frames **on the disk. These have to be stepped through, one by one; pressing "Play" would result in a** rapid, confusing succession of images, **like a run-away** slide projector.

To **Select a Chapter: In the function mode, dial "0-** [Chapter **Number]-*." For example to select Chapter 11, dial "01** 1 *":

0 = **Go to the numeric mode and interpret the keypad entries as a chapter number.**

11 = **Chapter 11.**

* = **Put the first frame of the chapter on the screen and return to the function mode.**

» **The first frame will appear frozen on the screen; pressing** *"2"* **("Play") will cause the laser-disk player to begin running the program from that frame.**

To Select a Frame: In the function mode, dial "8"- [Frame **Number]-*." For example, to select Frame 41222, dial "841222*":**

8 = **Go to the numeric mode and interpret the keypad entries as a frame number.**

41222 = **Frame 41222.**

* = **Put that frame on the screen and return to the function mode.**

» **The first frame will appear frozen on the screen; pressing "2" ("Play") will cause the laser-disk player to begin running the program from that frame.**

To Select a Stopping Point: The above two procedures select a starting point. To select a point at which the program will automatically halt, use the above formulae but enter a "#" instead of a "*" as the final keystroke. You can select the stopping point either before or after selecting the starting point.

» **The keypad will return to the function mode, and the last frame that was on the screen will reappear.**

Note: **Some disks have built-in stop marks between chapters. These could stop the program before it hits the stop mark you set in the numeric mode. Pressing "Play" again will cause the disk to run again until it hits your stop mark (or another intervening stop mark on the disk).**

Selecting Audio Channels

Some stereo disks are bilingual, using the left audio channel for a narrator in one language (e.g., English) and the right audio channel for a speaker. in a second language (e.g., French) . Since the Pio-. neer player's default audio mode is stereo,. the result would be hearing the two narrators simultaneously.

Selecting just Channel 1 (7) or just Channel 2 (*) is done with a single keystroke in the function mode. Selecting the combined Channels 1 and **2 is done by pressing "O-#." Once you have sclcctcd an audio function, it will remain in effect 'until you change it.**

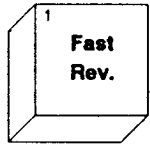## #24 Media-Center Control Function

This function allows a display phone to review and, if necessary, terminate a user's control of a media **line. Dialing "#24" will display the first video player's status in the following manner:**
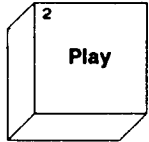
> VCR 717 = 105

or

> VCR 718 = Free

Laser-Disk Function Mode

Fast Reverse (1): Quickly pressing and releasing this causes the player to rapidly scan back about 300 frames (about ten seconds of viewing time). Holding it down causes the player to continuously scan backwards; however, it will continue scanning for a short time after you release this key.

Play (2): Begins playing from the frame currently on the screen (if you previously pressed "Freeze, Blank Screen," pressing "Play" will bring back the picture and begin playing from the point where the program had been "frozen").
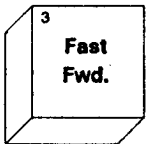
Fast Forward (3): Quickly pressing and releasing this makes the player scan ahead about 300 frames (about ten seconds' viewing time). Holding it down makes the player continuously scan, even shortly after you release this key.

Freeze/Step Backwards (4): This stops any motion and holds a frame on the screen. Pressing it when a frame is already "frozen" on the screen brings the previous frame onto the screen.
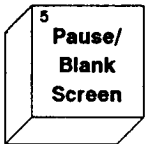
Pause/Blank Screen (5): This freezes" a frame but displays a blank blue screen. This is helpful when a presenter wants to halt a program to talk about what has been seen, and not have the audience distracted by the screen. Pressing "Play" or any of the other first six keys causes the player to start from the frame it had frozen.

Freeze/Step Forward (6): This stops any motion and holds a frame on the screen. Pressing it when a frame is already "frozen" on the screen brings the next frame onto the screen.

Channel 1 Audio (7): Pressing this selects the audio from the left channel only. Use "0-#" to restore mixed audio.
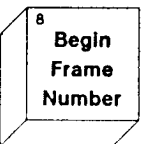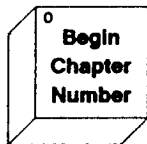
Begin Frame Number (8): This takes you to the numeric mode, where the digits you enter will be used to select a frame.
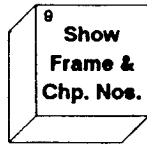
Show Frame and Chapter Numbers (9): This instructs the player to display the numbers on the upper left part of the screen. Of course, this works only for disks encoded with these numbers.

Channel 2 Audio (*): Pressing this selects the audio from the right channel only. Use "0-#" to restore mixed audio.

Begin Chapter Number (0): This takes you to the numeric mode, where the digits you enter will be used to select a chapter.
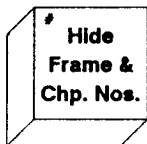
Hide Frame and Chapter Numbers (#): This prevents the numbers from being displayed on the upper left part of the television screen.

Selecting Laser-Disk Frames and Chapters

Step 1. In the function mode, press "8" to select a frame number or "0" to select a chapter number.
⇒ The player will halt, the screen will be a blue blank, and the system will begin interpreting your keystrokes under the numeric mode.

Step 2. Type the chapter or frame number.

Step 3. (a) *To go to the selected chapter or frame:* Press "*."
⇒ The frame or chapter will "freeze" on-screen, and the keypad will be in the function mode.

(b) *To make the selected chapter or frame the "end mark" (stopping point):* Press "#."
⇒ The currently selected frame or chapter will appear "frozen" on the screen, and the end mark will be in the system's memory.

Notes: (1) You cannot select the current frame as an end mark (because the player has already stopped there).

(2) Pressing "#" in the numeric mode also selects both audio channels. If this is not desired (e.g., on dual-language disks), press "7" (Channel 1) or "8" (Channel 2) before pressing "play."

"VCR" indicates the player's line, which may be either a video-tape or a laser-disk player. The first display shows that the player on **Media Line 7 17** is currently assigned to phone line 105. The second display indicates that player 7 18 is currently available.

To pre-assign a player to a specific station: **Enter the Architectural (dialing) Number of the station. The display will then list the new station owner. Unless an Administrative phone intervenes, only that owner can call this player, and the player will receive the initializing tones when it is called.**
Note: It is possible for an Administrative phone to use the normal call-transfer function to"transfer" a Media Line to another phone. However, this method is not recommended because the original "caller" would retain control of the media line. Thus, the user who received the transfer could not call the media line back after hanging up.

To terminate a connection: **Press the asterisk ("*") key on your dial pad. The display will show that the line is "Free."** Pressing the "*" key when the player is already "Free" will send the ending tones to it (see "'Automatic Control Signals" under "Media-Related Programming," above).
Notes: This method works whether or not a user is connected to a Media Line. If a user has hung up without

releasing a Media Line, any Administrative phone with a call-in Attribute (B:7 or B:8) can gain control of that line by calling it. However, only the #24 method allows you to assign control to another user.

Alternate Releasing Methods

MR100 *Reset* Button: This is meant to release a player from a user who has finished with it but failed to relinquish control before hanging up. Unlike the #24 method, this method does not send ending tones to the player.

"VCRxxx = 65535": The #24 review function will show this value instead of "Free" for a player that was released without receiving the appropriate ending tones ("0" for a laser-disk player, "0" or "5" for a VCR). To eliminate this setting, call the player, then release it with the appropriate ending tones.

To view the next Player extension: **Press the "#" key. When you have gone through the entire list of player lines, the words "END LIST" will appear in the display, and the system will ignore** any **subsequent key entries. To end the review at any point, hang up.**

Dialing Staff Phone (DSP) A:24

This line type is similar to an Administrative line but is typically used in a room with a speaker (and sometimes a call switch). DSPs receive dial tone and may dial calls directly **just like an** Administrative **phone. The differences are that a DSP cannot have a display, receive call-ins from room stations, activate alarm tones, or do executive override. These restrictions free "B" Attributes 5, 6, 7, and 8, which serve other purposes (see "DSP Attributes" immediately below).**

DSP Attributes

Dialing Staff Phones have two types of "B" Attributes: those that select individual functions and those that select sets of functions.

Individually Selected B: Attributes

These work on the same principle as the "B" Attributes for the other line types: programming one of these bits directly selects an individual function. For example, the "B:2" bit gives a DSP line the ability to make toll calls; omitting this bit prevents the line from making toll calls. See the "Individual 'B' Attributes" table at the right, for a complete list.

"B" Attribute Sets

The remaining "B" Attribute bits, "5" and "6," work in combination to select an entire group of functions. Instead of directly selecting an individual function, these two bits select one of four Location Codes. Each of these Location Codes can store a group **or set, of functions. For example, one set might (a) specify "'r-to-ground" as a priority call-in, (b) send such calls to LCD1 display**

Individual "B" Attributes

Bit	Function
B:1	Interconnect access
B:2	Toll access
B:3	Zone page
B:4	All page
B:7	Set to allow direct access to MRlOOs. Temporary access can also be allowed by preassignment from a display phone using the #24 function.
B:8	Not used

phones, and (c) enable the caller to cancel a call-in by pressing the call-in switch again.

Accordingly, there are two steps in programming these sets of functions: (1) storing up to four sets in Location Codes 65390-65396, and (2) selecting one of these sets for each DSP line by setting its "B:5" and "B:6" Attributcs.

Programming the Sets

For convenience, we refer to the functions in these sets as Indirect "C" and "D" Attributes (see the "Indir-cct Attribute Sets" table on the next page). They arc "indirect" because they cannot be sclcctcd directly on the display, in the way that "A" and "B" Attributes arc. Instead, each "C" and "D" Attribute has a value (called its "Programming Number" in the table). To program a set of functions, add

up their Programming Numbers and store this total in one of the four Location Codes (see the "Selecting an Attribute Set" table immediately below).

Selecting an Attribute Set

Set	Location Code	Selector Attributes
1	65390	B:
2	65392	B:5
3	65394	B: 6
4	65396	B:56

Indirect Attribute Sets

Indirect Attribute	Programming Number	Function
C:1	1	"T" ground = priority call
C:2	2	Ground & release to cancel
C:3	4	"T" ground goes to LCD1
C:4	8	"T" ground goes to LCD2
C:5	16	Resistor ground = priority call
C:6	32	Make and break resistor to cancel
C:7	64	Resistor call goes to *LCD1*
C:8	128	Resistor call goes to *LCD2*
D:1	256	"*" = priority call
D:2	512	Get dial tone and hang up to cancel
D:3	1024	"*" call-in goes to LCD1
D:4	2048	"*" call-in goes to LCD2
D:5	4096	"**" = priority call
D:6	8192	Get dial tone and hang up to cancel
D:7	16384	"**" call-in goes to LCD1
D:8	32768	"**" call-in goes to LCD2

Example: "'T' Ground to LCDl"   =   4
             "Resistor Gnd for Priority"   =   16
             "Resistor Call to LCD2"   = 128
                          Total   248

To make this Set l, store "248" at LocationCode65390.

Selecting a Set

On each DSP line, enter the combination of "B:5" and "B:6" that specifies the Location Code with the desired set of **Indirect** Attributes.

For cxample, to select Location Code *65394* (Set 3), enter *"B:6."* Note that omitting "B:5" and "B:6" automat-

ically selects Location Code 65390 (Set 1). Thus, to give all DSP phones the same set of Indirect Attributes, store this set at Location Code *65390,* and simply leave the "B:5" and "B:6" bits deleted from the individual DSP lines.

Single-Digit Dialing (64278-64296)

The "DSP [Dialing Staff Phone] Single-Digit Dialing Codes" table below works exactly like the Administrative single-digit table at Locations **64016-64034,** including echo-digit and circular-hunt capabilities. This primarily involves storing a Physical Number at one of the Locations to direct calls from DSP phones to that line whenever the corresponding first digit is dialed. Use this table only for DSP phones. DSP phones, in turn, do not respond to data stored in the main single-digit table. This allows DSP phones to be restricted from interconnect or from dialing each other, or to be given single-digit access to selected locations.

DSP Single-Digit Dialing Codes

Location	Digit
64278	0
64280	1
64282	2
64284	3
64286	4
64288	5
64290	6
64292	7
64294	8
64296	9

Single-Digit Reconnect

Starting with Version 204 system software, you can program the system so that a user can be reconnected with a media line by dialing the programmed digit (e.g., "7"). When this digit is dialed, the system checks to see which media line is assigned to the user's phone. Thus, all dialing phones can use the same digit to reconnect with their own media line. If the user does not have control of a media line, the system will give a disallow "beep."

To set up this function, enter the lowest Physical Number of the media lines in the appropriate Location Code (see the "DSP Single-Digit Dialing Codes" table, above). The system will check each media line in succession for the caller's number, similar to what it does in the "hunt" function (however, it is not necessary to set the hunt bit on the media lines).

DSP Calling with Dial Pad

Pressing the "*" is equivalent to grounding the "T" terminal and will produce a call-in according to the programming of the "D" Attributes. Pressing the "*" twice within about 1 second is equivalent to a resistor call-in; it

will persist even if the caller hangs up. If the remote-canceling feature is enabled, the call-in can be canceled by picking up the phone again and hanging up without dialing anything. The phone can also have an associated call switch for calling in from another part of the room. Through the "D" Attributes, the phone and the switch can make different types of call-ins, which could go to different LCD drivers.

Monitor, Serial-Port, and Memory Functions

Alternate EEPROM Memory

Like the standard CPU2, the CPU3 has a second block of EEPROM memory for storing either a back-up copy of the user programming or an alternate set of programming that could be used at night, during weekends, etc. What is new on the CPU3 is, first, that this block can be accessed by grounding MI0 terminal "A70." Grounding "A70" causes the system to run off this alternate programming. to change this programming, use the #99 and #98 functions. Third, the TCPU3 diagnostic program can program this block without applying the "A70" jumper, setting the program jumper to "enable," or turning off the Monitor Lock (see "Preventing Programming Changes," below).

Note: Starting with Version 204 system software, after the #98 or #99 function has started, the display will show a "1" or a "2," indicating which EEPROM block you are working with.

TCPU3 Diagnostic Program

The new TCPU3 Diagnostic Program begins by checking whether it is connected to a CPU2 or a CPU3. If it detects a CPU2, it lets you select the TCPU2 (formerly called the T6) program; if it detects a CPU3, it automatically loads its new diagnostic mode.

This new mode is very different from TCPU2, which works with the S-bit *CPU.* Some differences are:

a. The TCPU3 uses a special protocol to set the CPU3 baud rate, which can be as high as 9600.

  Note: Adding "128" to Location Code 64268 will prevent the TCPU3 from changing the baud rate on a CPU3; this is explained further on, under "Baud-Rate Selector." (This setting is irrelevant to the CPU2, because its baud rate is set by a hardware jumper.)

b. It uses binary packets instead of ASCII hex files when making memory-block transfers. This increases speed and reliability.

c. It can override both the hardware EEPROM lock-out jumper the software "Monitor Lock," even from a remote location.

d. It addresses separate EEPROM blocks by software and so does not need a ground jumper on "A70," as explained in the preceding subsection.

e. The I/0 diagnostic contains more information and does not require halting.

f. It can use application programs to review or modify the EEPROM set-up data.

Important: To copy programming from a *CPU2* to a *CPU3* follow this sequence:

1) Start the *"TCPU2.Exe"* (new name) or "T6" (old name) program.

2) Save the CPU2's programming to the computer's disk.

3) Install the CPU3.

4) Restart the TCPU3 Diagnostic Program.

5) Copy the programming from the disk to the CPU3.

Alternatively, if you are unsure which CPU you are working with (e.g., because you are working via a modem at a remote location), you can start the TCPU3 program. If it detects a CPU2, it will prompt you to load the TCPU2 program. If you do this, you must restart the TCPU3 program before working with the CPU3. The new diagnostic program checks which CPU it is working with at the beginning. If you switch to the CPU3 after the program has started, it will continue operating in the TCPU2 diagnostic mode, which will not work properly with a CPU3.

Preventing Programming Changes

There are two basic methods of preventing unauthorized changes to the user programming: the hardware programming jumper on the *CPU* board, and the software "Monitor Lock" function (Location Code 64 100). When either lock is engaged, the "#" programming functions can still read and display existing programming entries. When used by itself, the hardware lock allows attempted programming changes made by an Administrative phone to appear on the display, but the system will not save these changes. The software "Monitor Lock" does not even allow attempted changes to appear on the display.

Diagnostic Override

Note that either of these locks can be bypassed via the serial port, which would be used by a computer with the TCPU3 Diagnostic Program. This port ignores the software Monitor Lock but requires a command to override the hardware jumper: simply go to the "terminal mode" and type 1O1E=1O (note that the last character is the letter "0," meaning "output"). To restore the functioning of the hardware jumper after using this command, either type 1O1C=1O or reset the system.

Programming-Disable Jumper

This prevents all changes to the programming even if the software "Monitor Lock" is "open." This three-pin header is on the front middle part of the CPU board. Place the sleeve jumper in the "N" position to enable the programming function or in the "D" position to disable the programming function. As expained in the preceding paragraph, this jumper can be overridden by a computer connected to the board's serial port.

Monitor Lock (Location 64100)

When the hardware programming jumper is in the "enable" position, this software function can prevent

changes to selected parts or all of the user programming. Simply consult the table below, add the "bits" for each function you want disabled, and enter the total in Location Code 64100. For example, to disable all functions, enter "15" (1+2+4+8).

Bit	Function to be Disabled
1	#96 97, 98, and 99 functions disabled. Display phones cannot change EEPROM data (see the note below).
2	#31 Night-answer user switching disabled.
4	#73, 74, 75, and 76 diagnostic functions disabled.
8	Monitor "Go" function, serial-port changes to the EEPROM, and output commands are all disabled (see the note below).

Note: Even when the "#" and "Monitor" functions are disabled, you can still review the current settings.

Technical Information

The following information is for technicians diagnosing the system.

Baud-Bate Selector (Location 64268)

This setting controls the rate at which data can travel through the serial port, used by a computer for diagnostic purposes. This Location Code sets the initial baud rate after the CPU3 has been turned on or reset. Select the appropriate entry from the following:

0 300 baud
1 1200 baud
2 2400 baud
3 4800 baud
4 9600 baud
5 19,200 baud (not used by the TCPU3)

Note: Entering any other number at this Location Code will select the default setting of 1200 baud. Adding "128" to this Location Code will prevent the CPU3 from adjusting its baud rate in response to the TCPU3 program.

Trap Vector

64270 Trap-Address Offset.
64272 Trap-Address Segment.

Additional Monitor Commands

"xxxx:" sets the Segment Address to "xxxx" (it also sets the Link Number for node commands).
"xxxxc=" sets the Offset Address to "xxxx" (it also sets the Physical Number for node commands).
"nL" node command executes the command "n" below and returns the line status.

The Commands

0 Take no action but report status.
1 Connect the specified line to the specified link.
2 Disconnect.
3 Turn on the speaker relay.
4 Turn off speaker relay.
5 Turn on the single-link phone relay.
6 Turn off the single-link phone relay.
7 Create an active-list record if none already exists.
8 Delete the active-list record.

The status is reported as four characters, *abcd:*

a = "+" *(off* hook), "-" (on hook), "N" (no hybrid).
b = "N" (no input to "T"), "R" (resistor), or "G" (ground).
c = "V" for VCM activated, or "v" for not activated.
d = "A" if the line is active, "a" if it is not.

Menu Function #90

Dial this code from a display phone to see a list with descriptions of all the "# + number" programming codes. Enter any digit to see the first code beginning with that digit (e.g., press "7" to see "#73," "#74," etc.). Press "#" to step through the codes in numerical order.

Time and Date Display

All Telecenter displays show the time and date. A small battery on the CPU will maintain them while the system is off. The time can be synchronized by an associated 2490 Master Clock.

Setting the Time and Date

Step 1. Dial "#55."
» The display will read:

> Hour XX (n, #)

Step 2. To change the hour, use the dial pad to type **the new one. Always use** a two-digit number (e.g., "09").
» The hour digits will show the new setting.

Step 3. When the setting is satisfactory, press "#."
» The display will read:

> Minute XX (n, #)

Step 4. If necessary, enter a new value. When the desired one is shown, press "#."
» The display will read:

> AM, PM, Mil

Step 5. Type "A" (AM), "P" (PM), or "M" (24-hour Military time).

» **The display will show the hour, minute, and "AM," "PM," or "Mil":**

> XX:XX:W(Y,N)

Step 6. If the setting is not satisfactory, type "N" to return the display shown in Step 1. If the setting is satisfactory, type "Y."

» **The new time will be stored and the display will read:**

> Month XX (n, #)

Step 7. If necessary, type in a different two-digit number for the month (e.g., "06" for June). When the desired number appears, type "#."

» **The display will read:**

> Day x x (n, #)

Step 8. If necessary, type in a different two-digit date. When the desired number appears, type "#."

» **The display will read:**

> Year XX (n, #)

Step 9. If necessary, type in a different two-digit number (e.g., "91" for "1991"). When the desiredyearappears, press "#."

» **The display will read:**

> XX-XX-XX (Y, N)

Step 10. If the date is not satisfactory, press N to bring back the display shown in Step 6. When it is satisfactory, press "Y."

» **The new date will be stored and the display will read:**

> End Time Set

Step 11. Hang up to clear this message.
» **If there are call-ins waiting, they will appear on the display. Otherwise, the display will show the time and date.**

Synchronizing from a 2490 Master Clock

Connect the clock's synchronization output ("DIG") to the Telecenter unit's MI0 terminal "A68." The clock and TC IV commons must also be connected with each other.

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Accessing and Releasing

1. Tune the television set to the desired channel.
2. Dial the number of the desired player.
3. Wait for a "beep."
4. Use the phone keypad to control the player.

> *To hang up without releasing a player*, make sure that you are in the function mode, then hang up.
> *To resume contact with a player*, call its number again and wait for a "beep."
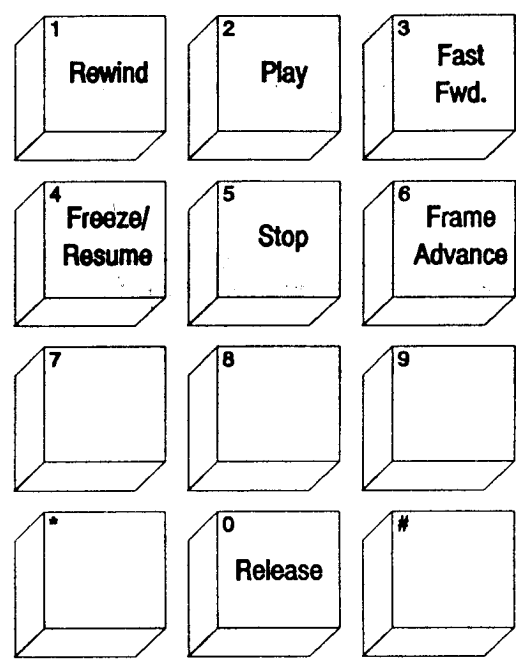
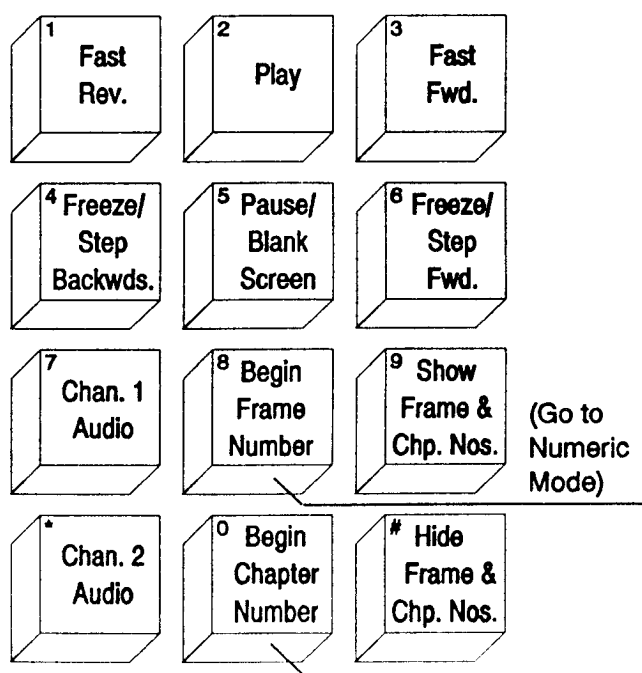5. *To release a player*, press "0" and hang up.

Special Laser Commands

To select a laser-disk frame: 8-0-[frame no.]-*.
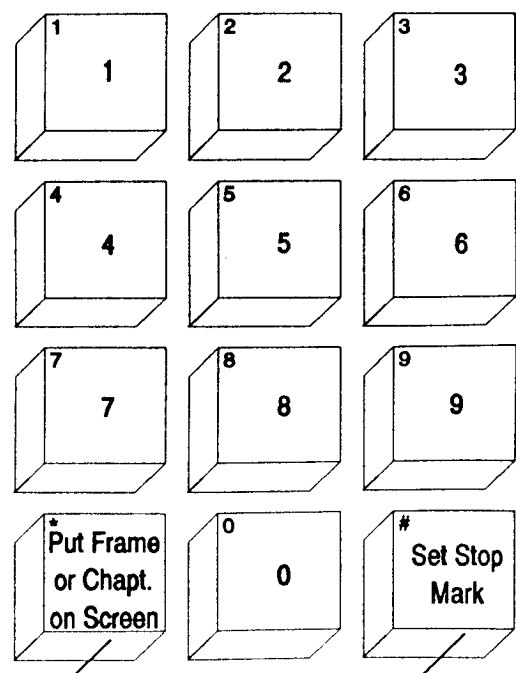*To select a laser-disk chapter:* 0-[chpt. no.]-*.

VCR Functions

1 Rewind	2 Play	3 Fast Fwd.
4 Freeze/ Resume	5 Stop	6 Frame Advance
7	8	9
*	0 Release	#

Laser Function Mode

1 Fast Rev.	2 Play	3 Fast Fwd.
4 Freeze/ Step Backwds.	5 Pause/ Blank Screen	6 Freeze/ Step Fwd.
7 Chan. 1 Audio	8 Begin Frame Number	9 Show Frame & Chp. Nos.
* Chan. 2 Audio	0 Begin Chapter Number	# Hide Frame & Chp. Nos.

(Go to Numeric Mode)

(Go to Numeric Mode)

Laser Numeric Mode

1 1	2 2	3 3
4 4	5 5	6 6
7 7	8 8	9 9
* Put Frame or Chapt. on Screen	0 0	# Set Stop Mark

(Go to Play Mode)

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