14 EMULATION [ZETA-THREE^{em}]

14.1 INTRODUCTION

The ZETA-THREE^{em} receives and transmits both Sony and Ampex communication protocols through its **Computer Port**, and operates its **Slave Transport** according to the commands received there.

Two modes of emulation are offered . .

14.1.1 FULL EMULATION MODE

Here the Zeta operates as if it were a VTR, and is normally connected to the Editing system by a single RS-422 communications cable.

The Zeta's slave transport may be configured at the Editor as a Source or Record VTR. If the Editor supports a "chase" mode of operation, then the Zeta's transport may also be set up to chase the Record VTR.

14.1.2 CHASE EDIT MODE

This is a hybrid mode. On the one hand, the Zeta provides its normal (non-emulation) chase function so that the slave transport chases the Record VTR (whose time code has been fed to the Zeta's master time code input). On the other hand, the Zeta's emulation routines monitor the serial communication between the Editor and the Record VTR, and, filtering out all but the editing commands, cause the slave transport to record or rehearse in parallel with the Record VTR.

Chase Edit will be particularly valuable in Editing systems where the number of available serial control ports is limited.

14.2 EMULATION SETUP

These instructions assume that the reader already has some familiarity with the menu structure of the ZETA-THREE^{em}.

For each of the Editors supported by the ZETA-THREE^{em}, a corresponding **Editor Configuration Sheet** will have been provided with this manual. Be sure to keep this sheet on hand during the following procedures.

14.2.1 DECISIONS TO BE MADE

FULL EMULATION OR CHASE EDIT ?

This decision depends upon the intended use of the Zeta's slave transport and upon the available Editor resources:

Intended Use of Transport	Editor Resources	EMULATION MODE
Chase the Record VTR	Editor has chase capability	FULL EMULATION
Chase the Record VTR	Editor does not have chase capability **or** Spare Editor control port is not available	CHASE EDIT
Emulate a Source VTR		FULL EMULATION
Emulate a Record VTR		FULL EMULATION
Emulation for Digital Audio Workstation applications		FULL EMULATION

Setup procedures for Full Emulation and Chase Edit are described separately in sections 14.2.2 and 14.2.3 respectively.

DOES THE EDITOR HAVE APPROPRIATE SOFTWARE ?

For the **Full Emulation** mode, it is essential that the Editor is equipped with an interface for the VTR being emulated by the ZETA-THREE^{em}.
For example, if the Zeta's "S09 EDITOR /VTR ->" menu associates a particular Editor with Ampex VPR-3 protocols, then any attempt to operate that Editor with Sony protocols will prove to be quite futile.
Suitable VTR interface software for the Editor should be obtained from the Editor manufacturer.

The **Chase Edit** mode is less demanding in the choice of Editor/VTR combination. Two "generic" combinations have been provided for use in this mode.

IS AUTOMATIC TRACK SELECTION APPROPRIATE ?

The ZETA-THREE^{em} provides automatic record track selection through its master transport connector. This feature should be used under the following conditions:
(a)   The Zeta's transport is chasing the Record VTR, and its channel selections must exactly mirror those of the Record VTR, or
(b)   The Zeta is in fact emulating the Record VTR.

If automatic track selection is not employed, then selection must be performed manually by the operator. For multitrack ATR's this will probably be the preferred method.

14.2.2 FULL EMULATION SETUP

SELECT THE TRANSPORT

F1.   Power up the ZETA-THREE^{em}.

F2.   Select the appropriate slave transport from the "S06 TRANSPORT ->" menu.

MAKE NECESSARY CONNECTIONS

F3.   Power down the ZETA-THREE^{em}.

F4.   Feed the studio video reference signal to one of the Zeta's VIDEO IN jacks. This input is not terminated, so if the reference is not "looped through" then a 75ohm terminator should be plugged into the Zeta's other VIDEO IN jack.

F5.   Run the appropriate transport control cable between the transport and the Zeta's SLAVE TRANSPORT connector.

F6.   Connect the transport's time code output to the Zeta's SLAVE CODE IN connector.

F7.   By consulting the Editor Configuration Sheet, determine whether or not the Editor requires a time code connection in addition to the 9-pin serial cable. If this is the case, then time code from the Slave transport must be externally "Y"ed and fed both to the Zeta's SLAVE CODE IN and to the Editor's time code input. (Although the Zeta's time code input is balanced - pin 3 hot - some care may still be required when "Y"ing unbalanced time code lines, as it is possible, depending on connector configurations, to short out the signal altogether.)

F8.   If the track select feature is to be used, connect an appropriate track select cable between the Slave transport and the Zeta's MASTER TRANSPORT connector (see Section 14.4 below).

F9.   Run a standard RS-422 cable from the Editor's control output to the ZETA-THREE^{em} COMPUTER port.

F10. An optional ZETA REMOTE may be connected to the Zeta's REMOTE port in the usual fashion.

SELECT EMULATION PARAMETERS AND MODE

F11. Power up the ZETA-THREE^{em}.

F12. Select the desired Editor/VTR combination from the Zeta's "S09 EDITOR /VTR ->" menu. This will determine which type of VTR is to be emulated, and emulation Constants for the slave transport will be set up accordingly. Two "generic" combinations are included, and may be used when emulation and synchronization requirements are not excessively demanding. Currently available choices are:

```
S09 EDITOR /VTR      ->
                          .ACE 25     /VPR-3
                          .BVE-900    /BVU-950
                          .BVE-5000   /BVU-950
                          .BVE-9000   /BVU-950
                          .CMX MULTI  /VPR-300
                          .CMX MULTI  /VPR-3
                          .CNVGNC 195/BVW-10  *
                          .GENERIC    /BVU-950
                          .GENERIC    /VPR-3
                          .GRASS 41   /VPR-3
                          .GRASS 51   /VPR-3
                          .GRASS 141  /VPR-3
                          .GRASS 151  /VPR-3
                          .NED POSTPR/BVU-950
                          .PALTEX     /SPECIAL
                          .SSL SSOUND/BVU-950
                          .TIMELOGIC /VPR-3
                          .VIDEOMEDIA/VPR-3
```

F13. From the sub-menu below menu item "Z08 COMPUTER PORT ->" select ".5 VTR EMULATION".

When the CAPTURE key is pressed, the following conditions are automatically established:
- The slave transport is disabled and stopped. It will appear to the editor as being "unthreaded" or as having its cassette "ejected".
- All cycle modes are cleared (Z04 LOOP=OFF).
- Slave tape limit and system end point are cleared. (i.e. S05 LIMIT -------- and Z_END -- -- -- --)
- Slave record and rehearse are disarmed.
- System resolve mode is set to video (Z06 RESOLVE=VIDEO).
- The Master transport connector is converted to a track select output (M03 OUTPUT=TRACK SEL).

CHECK TRANSPORT OPERATION

F14.   Make sure that the Zeta's Slave transport has tape loaded, and that this tape has time code correctly recorded on it.

F15.   Enable the ZETA-THREE*em* SLAVE only.

F16.   Press the STOP/CONT key on the Zeta's front panel to verify that the Zeta is in control of the transport, which should now enter play mode. Press STOP/CONT again to stop the transport.

ESTABLISH AND CHECK COMMUNICATION WITH THE EDITOR

F17.   At the Editor, configure the appropriate communications channel to interface to the VTR which appears in the Zeta's Editor/VTR menu. Consult the Adams-Smith **Editor Configuration Sheet** and, if necessary, the Editor's manual before doing so.
Note that some Editors will require a Reset before communications can begin.

F18.   Verify that the Editor is in fact communicating with the ZETA-THREE*em* by observing the "Z08 COMPUTER PORT ->" menu. The presence of a solid or flashing asterisk in this menu indicates that incoming commands are being detected and processed by the Zeta's serial routines.

         Z08*COMPUTER PORT ->

F19.   At the Editor, select the VTR transport key to which the Zeta is attached, and press Play. The transport should begin playing and resolving, and the LOCK LED should illuminate after a short synchronization period. Some Editors will display the time code from the Slave transport.

F20.   Establish an IN point at the Editor, and check cueing operations by executing one of the Editor's cue commands (Cue to preroll, Cue to In Point etc).

Note: For most Digital Audio Workstation and other non-editing applications, this installation is now complete.

CHECK EDITING FUNCTIONS

F21.   Temporarily extend the Editor's preroll time out to about 10 seconds. This will allow you to observe the synchronization process without being interrupted by edit aborts.

F22.   Set up a short edit and execute a Preview to check that the Editor can successfully synchronize the Zeta's transport.
It is possible that the Editor will put the Zeta's transport into rehearse mode during the preview. However, this is not universal among Editor's, and will also depend on the transport's rehearsal capabilities (or lack thereof).

F23.   Reduce the Editor's preroll time to a value within which synchronization can be successfully achieved (5 seconds has been found to be a reasonable target).

F24.   Perform the same edit, and verify that the Zeta's transport enters and exits record correctly.

F25.   If the Track Select output is being used, then confirm that the various channel selections at the Editor actually produce the correct results in both preview and edit modes.

14.2.3 CHASE EDIT SETUP

SELECT THE TRANSPORT

C1.   Power up the ZETA-THREE^{em}.

C2.   Select the appropriate slave transport from the "S06 TRANSPORT ->" menu.

MAKE NECESSARY CONNECTIONS

C3.   Power down the ZETA-THREE^{em}.

C4.   Feed the studio video reference signal to one of the Zeta's VIDEO IN jacks. This input is not terminated, so if the reference is not "looped through" then a 75ohm terminator should be plugged into the Zeta's other VIDEO IN jack.

C5.   Run the appropriate transport control cable between the transport and the Zeta's SLAVE TRANSPORT connector.

C6.   Connect the transport's time code output to the Zeta's SLAVE CODE IN connector.

C7.   If the track select feature is to be used, connect an appropriate track select cable between the Slave transport and the Zeta's MASTER TRANSPORT connector (see Section 14.4 below).

C8.   Using an Adams-Smith "Chase Edit Y-Cable", connect the Zeta's COMPUTER port to the serial line which runs from the Editor to the Record VTR. Documentation detailing this connection is provided with the Y-Cable itself.

C9.   Run a line from the Record VTR's time code output to the Zeta's MASTER CODE IN connector.

C10.   An optional ZETA REMOTE may be connected to the Zeta's REMOTE port in the usual fashion.

SELECT EMULATION PARAMETERS AND MODE

C11.   Power up the ZETA-THREE^{em}.

C12.   From the Zeta's "S09 EDITOR /VTR ->" menu, select ".GENERIC /BVU-950" if the
       Record VTR uses any kind of Sony protocol, and ".GENERIC /VPR-3" if the Record
       VTR is an Ampex. Emulation Constants for the slave transport will be loaded
       accordingly.
       If a more specifically correct Editor/VTR combination is found in the menu list, then it may
       be used if desired, but for the Chase Edit mode it is unlikely to provide any advantages.

C13.   Enter the sub-menu below menu item "Z08 COMPUTER PORT ->", and select
       ".6 VTR CHASE EDIT".
       When the CAPTURE key is pressed, the following conditions are automatically established:
       -       Master and slave transports are disabled and stopped.
       -       All cycle modes are cleared (Z04 LOOP=OFF).
       -       The system end point is cleared (Z_END -- -- -- --)
       -       Slave record and rehearse are disarmed.
       -       System resolve mode is set to video (Z06 RESOLVE=VIDEO).
       -       The Master transport connector is converted to a track select output
               (M03 OUTPUT=TRACK SEL).

ESTABLISH COMMUNICATION WITH THE EDITOR

C14.   Force the Editor to re-establish communications with the Record VTR, either by re-
       assigning the communications channel, by resetting the Editor, or simply by unplugging
       and re-attaching the communications cable between the Editor and the VTR. This action
       may be quite important in establishing communications with the ZETA-THREE^{em}.

C15.   Observe the "Z08 COMPUTER PORT ->" menu to verify that the ZETA-THREE^{em} is in
       fact intercepting communications between the Editor and the Record VTR. The presence
       of a solid or flashing asterisk in this menu indicates that commands are being detected
       and processed by the Zeta's serial routines.

               Z08*COMPUTER PORT ->

CHECK TRANSPORT OPERATION

C16.   Load tape both on the Record VTR and on the Zeta's Slave transport. Make sure that
       each tape has correctly recorded time code.

C17.   Enable the ZETA-THREE^{em} SLAVE only.

C18.   Press the STOP/CONT key on the Zeta's front panel to verify that the Zeta is in control of
       the transport, which should now enter play mode. Press STOP/CONT again to stop the
       transport.

C19.   Establish an offset between the Record VTR's time code and that of the Zeta's slave
       transport. This operation is described elsewhere in this manual

C20.   Enable the ZETA-THREE^{em} MASTER as well as the SLAVE.

C21.   Play the Record VTR and verify slave synchronization. The LOCK LED should illuminate
       after a normal synchronization period. Observe the slave error display ("S_ERR") as the
       slave chases and synchronizes to the master time code.

CHECK EDITING FUNCTIONS

C22.   Temporarily extend the Editor's preroll time for the following tests (about 10 seconds will do). This will allow you to further observe the synchronization process without being interrupted by edit aborts.

C23.   At the Editor, set up a short edit.

C24.   **Cue the Record VTR to the Preroll point and wait for the Zeta's slave transport to "catch up" and park.**

C25.   Execute a trial Preview to re-check slave synchronization.
It is possible that the Editor will put the Zeta's transport into rehearse mode during the preview. However, this is not universal among Editor's, and will also depend on the transport's rehearsal capabilities (or lack thereof).

C26.   Reduce the Editor's preroll time to a value within which synchronization can be successfully achieved (5 seconds has been found to be a reasonable target).

C27.   Perform the same edit, and verify that the Zeta's transport enters and exits record correctly.

C28.   If the Track Select output is being used, then confirm that the various channel selections at the Editor actually produce the correct results in both preview and edit modes.

14.3 OPERATIONAL NOTES

14.3.1 CHASE EDIT OPERATION

As already indicated step C24 of section 14.2.3, CHASE EDIT SETUP, the following sequence of events must take place whenever a preview or edit is executed using the Chase Edit mode:

1.   Cue the system to the edit Preroll point.

2.   Wait for the Zeta's slave transport to "catch up" and park.

3.   Execute the Preview or Edit

The reason for this procedure is that the ZETA-THREE^{em} is only "listening" to the commands from the Editor to the Record VTR, and has no way of telling the Editor that it is in position at the Preroll point and ready to perform the edit. Consequently, this state of readiness must be confirmed by the operator.

(Although the ZETA-THREE^{em} does have other methods by which it can report its ready status, no Editors tested to date have the facility to accept an external ready/not-ready status signal.)

14.3.2 SIMULTANEOUS ZETA OPERATIONS

MIDI OPERATIONS

The MIDI section remains fully operational during emulation, and will chase the Master time code input if the Master is enabled, or the Slave "emulator" if it is enabled while the Master is not. Due to the extra memory space required for Emulator software, the maximum number of Tempo Map Banks has been reduced from seven to three.

EVENT TRIGGERS

All 10 event triggers are still available, including their MIDI trigger options, and may be triggered either from the Master time code input if the Master is enabled, or from the Slave "emulator" time code if it is enabled while the Master is not.

ZETA REMOTE

Operation of the Zeta Remote is not inhibited in any way.

14.3.3 CONTROLLING EDITS BY CHANNEL MASKING

Under normal conditions, the Zeta's transport will enter and exit Record (or Rehearse) at the beginning and end of the current edit period. In the spirit of full VTR emulation, the Automatic Track Select feature has been provided so that track action at the Zeta's transport will exactly mimic expected VTR action. Moreover, if the transport is an ATR, then no tracks will be selected during a video-only edit and no actual recording will take place, although the main record lamp will probably still illuminate during the edit.

This is all very neat and tidy, but is not always desirable! Perhaps the transport has more tracks than the Editor can handle. Perhaps track selection is not intended to match the Record VTR, or Automatic Track Select has been left unconnected.

The ZETA-THREE^{em} provides a very workable solution to these problems by allowing the operator to make specifications such as the following:
   "Record only if one or more Audio channels have been selected"
or   "Record only if Audio channel 4 has been selected"

In other words, Record and Rehearse activity can be made to depend upon specific track selections or track combinations which are set up in advance by the operator.

ZETA-THREE^{em} Slave Constant F4 controls these selections. Please refer to Appendix A, ADAMS-SMITH ZETA THREE SLAVE TRANSPORT CONSTANTS.

14.3.4 EDITING ON FIELD 2

This feature is available only when emulating with Sony protocols. Edits will normally occur at the beginning of Field 1, but can be moved to the beginning of Field 2 by "setting the 1 bit in Constant E3 msd" (please refer to Appendix A, ADAMS-SMITH ZETA THREE SLAVE TRANSPORT CONSTANTS). In simpler terms, to edit on Field 2, "make the left hand digit of Constant E3 and odd number".

14.3.5 VTR DIGITAL AUDIO CHANNELS

Some editors now offer support for the digital audio channels which appear on several of the newer VTR's. The ZETA-THREE^{em} may be instructed to use these tracks as its source of track selection.

Please refer to Constant E2 msd in Appendix A, ADAMS-SMITH ZETA THREE SLAVE TRANSPORT CONSTANTS.

14.3.6 JOG AND SHUTTLE

Jog and shuttle commands from the Editor will in most cases invoke appropriate jog and shuttle routines within the Zeta. If no such capability is available for the attached transport, then a simple fast forward or rewind will be executed.

14.3.7 LEAVING EMULATION MODE

Enter the sub-menu below menu item "Z08 COMPUTER PORT ->", and select ".1 OFF".
When the Capture key is pressed, the Zeta will automatically perform a power-up style reset to ensure that all transport parameters have been returned to their normal state. The message "-- SERIAL RESTART --" will be displayed.
System resolve mode and Master transport connector assignment will be restored to the selections which existed prior to entering emulation mode.

When not in emulation mode, the ZETA-THREE^{em} is functionally identical to a standard ZETA-THREE.

14.3.8 RE-ENTERING EMULATION MODE

From the sub-menu below menu item "Z08 COMPUTER PORT ->" select either
".5 VTR EMULATION" or ".6 VTR CHASE EDIT" as appropriate.
Depending on prior configuration, the Zeta may perform a power-up style reset, displaying the message "-- SERIAL RESTART --".

14.3.9 SAVING TRANSPORT AND EDITOR/VTR SELECTIONS

Normal ZETA-THREE operation allows Slave transport Constants to be saved in banks of non-volatile "User" memory using the Slave menu item "S07 SAVE TRANSPORT ->".

The ZETA-THREE^{em} expands this concept so that both the Transport Constants and the Editor/VTR Constants are saved in the same User area. When restored, via the
"S06 TRANSPORT ->" menu, the Editor/VTR selection will also be restored, and the serial port protocol selection will be adjusted as necessary.
Note that the Zeta may as a consequence perform a power-up style reset and display
"-- SERIAL RESTART --".

Examples:
1.   A studio may have several different transports to connect to the same editor using the same ZETA-THREE^{em}. Should the different machines require different optimization of the Editor/VTR Constants, then each combination may be saved in a User area.

2.   Another studio may wheel around a single transport and ZETA-THREE^{em} combination to be connected to several different Editors. Separate sets of Constants, each optimized for a different Editor, may be saved in the User areas. Loading from the User areas will then:

   (a)   set Transport Constants

   (b)   set Editor/VTR Constants

and   (c)   if the Zeta is in emulation mode, adjust the serial port for Sony or Ampex protocol as required.

14.4 AUTOMATIC TRACK SELECT

When emulation mode is invoked, the ZETA-THREE^{em} MASTER TRANSPORT connector automatically becomes a TRACK SELECT output which controls one Video channel and four Audio channels for both recording and rehearsal (EE).
Track select cables are currently being developed by Adams-Smith, and will be made available in drawing form only. The occasional transport will require modification, usually in the form of extra back panel connections which provide access to internal track select and input switching signals. If the track select feature is not being used, then the MASTER TRANSPORT connector may be manually switched back to any of the other available functions, namely
"MO3 OUTPUT=TRANSPORT", "OFF" or "AUX3-10". Emulation performance will in no way be affected.

14.4.1 TRACK SELECT CONNECTOR PINOUTS

The TRACK SELECT connector may appear in two different formats depending on the setting of slave transport Constant D8 lsd. Both formats provide 4 channels of audio "record ready" controls. One further provides a video record ready signal plus general purpose EE functions, while the other adds four individual audio EE (input) signals.
Please refer to Appendix A, ADAMS-SMITH ZETA THREE SLAVE TRANSPORT CONSTANTS.

Conn'r Pin #	Constant D8 lsd = 0,1,2	Constant D8 lsd = 8,9,A
3	Track A Record Ready	same
4	Track B Record Ready	same
5	Track C Record Ready	same
6	Track D Record Ready	same
7	Video Record Ready	Track A EE (input)
8	Full EE On	Track B EE (input)
9	Select EE On	Track C EE (input)
10	Preview (Sony auto mode only)	Track D EE (input)
19	Common for pins 3-6 and 10	same
20	Common for pin 7	same
21	Common for pin 8	same
22	Common for pin 9	same

Four audio channels at a time may be assigned to the TRACK SELECT connector, also using slave transport Constant D8 lsd. Choices are as follows:

Value of Constant D8 lsd:	0 or 8	1 or 9	2 or A
Track A:	Analog 1	Digital 1	Digital 5
Track B:	Analog 2	Digital 2	Digital 6
Track C:	Analog 3	Digital 3	Digital 7
Track D:	Analog 4	Digital 4	Digital 8