



APPLICATION NOTE

Oct 25, 2004

TDC-100 VER 3.0 FIRMWARE

This application note describes version 3.0 firmware for the Lance Design TDC-100 disk controller. These are preliminary installation and operation notes. A version 3.0 manual is available for download from www.lancedesign.com.

Purpose of Ver 3.0

The firmware change is intended to provide many new operational features while preserving the simple operation of the TDC-100. It also corrects several bugs and greatly enhances the reliability of operation, especially when using clip names with servers such as the EVS Spotbox.

Installation

The firmware is changed by replacing three EPROM chips on the main board in the rack-mount frame. There are no changes to the control panel.

One of the chips is labeled U25. This goes in the main processor memory location, also labeled U25.

The other two chips are labeled U4/U12. They have the same contents, and should replace the chips at locations U4 and U12. Either chip may be used in either location.

As always, when replacing EPROMS, try to work in a static-free environment, and be sure to orient the chips properly (notch in chip matches notch in silkscreen). Make sure all leads go into the sockets.

Once the firmware is installed, and the cover is re-installed, recable the unit and power it up. You should see 'TDC-100 Frame Ver 3.0' displayed on the bottom line of the display, for a few seconds. You should then briefly see the message 'Memory Test OK', then the usual display.

You must go through ALL menu items and reset them to your preferences.

The menu order has been changed and some new items added, and the previous menu settings will be scrambled. Most of the old items are still there, although they are rearranged. The new items are described later. Your cues should remain intact.

Also, there should be no problem loading saved cue lists from previous versions of TDC firmware using the CUEMAN utility. The saved menu config will not be able to be used since there have been many changes to the menu items.

New Features

1) REGISTER LOCK

This provides a menu item which prevents modification to any registers. The intention is to turn the register lock on after all registers are loaded for a show to prevent inadvertent changes. If you try to mark, copy, trim, etc. any registers with the lock turned on, you'll get a 'Registers Locked' error message.

2) MULTI-POINT LOOPS

There is now the capability to do multi-point loops, where for example you play a lead-in, loop an internal portion, then (upon receipt of a 'terminate loop' trigger) play a tail out. Doing this requires four time values.

Start Point
Loop In
Loop Out
End Point

The way the controller accomplishes this is to use a pair of registers. The first register must be in the range 000-099. This register contains the Start Point, and the End Point (if there is one – it isn't required if there's no tail-out). The second register is in the range 100-199. It contains the Loop In and Loop Out times (the two 'inside' times). You select the lower register to run the loop. The controller will always look at that number + 100 for the two inside times, i.e., if the lower register is 025, the controller will look at register 125 for the two inside times.

The inside loop must have a minimum duration of 1:15, just like a normal loop, and must have both an inpoint and an outpoint. The Start Point must be at least as early as the Loop In point. There are no requirements placed on the End Point. There need not be a time in that register. If you do want to play a tail out (4-point loop) the End Point must be later than the Loop Out.

There are two new pbus triggers defined to run these loops: Trigger 8 is Multi-loop Play, and Trigger 9 is Multi-loop Terminate. There are some other new triggers defined also – I'll get to them later.

Since the Multi-loop Terminate trigger could come at any time, the TDC outputs a GPI trigger when the ddr actually exits the loop. You could use this to trigger the tail-out portion of a switcher effect if desired. There is a separate GPI output for each channel, and one more which is all four channels or'ed together.

New Features – Continued

3) BANK SELECT TRIGGERS

There are three more new pbus triggers defined. They are:

- Trigger 10 - Selects 000 bank of registers (000-099)
- Trigger 11 - Selects 100 bank of registers (100-199)
- Trigger 12 - Selects 200 bank of registers (200-299)

These triggers will not alter the tens and units digits, but will change the hundreds digit and recall the register. This allows you to recall multiple clips within a single emem by issuing triggers.

For example, say you've just recalled register 025. If you then issue a Trigger 11, the TDC will recall register 125. Trigger 12 will recall register 225.

The trigger must have a valid device number, as always. The register will recall and cue, just like a normal pbus recall.

4) REGISTER OFFSET

It's now possible to add a positive or negative offset time to all registers

The operation is as follows:

- Select the register number where you want the changes to start. This works like the 'Clear All Reg' function – it starts on the current register and goes up. Generally you'd select register 000, I'd think.
- Enable the machines you want to affect. If you want to shift all times, light up A, B, C, D. If you only want to shift times for the A machine, just select that channel.
- Press <FCN>, the <TM>. The display will prompt you to 'Enter Offset Time'.
- Enter the time you want added. If you want to subtract, precede the time you enter with a minus sign.
- Press <SET>. This will validate the time you've entered and prepare to do the calculations. The display will say SET xx:xx:xx:xx (whatever your offset time is).
- Press <TM> again. This starts the sequence. You can stop it by pressing the STOP button.

It will add the entered time to all registers for all selected channels (in points and out points). Clip names will be unchanged. If a register is empty, it will remain empty. It goes fast and can change a lot of times in a hurry. You might want to make sure you have your cues saved with Cueman before trying this, just in case it doesn't do what you thought it would.

(continued)

REGISTER OFFSET - Continued

One thing to be aware of: the DF/NDF mode of the time you enter (keypad) is determined by the timecode type of the displayed machine. The TDC will use this code mode for all calculations.

A WORD OF CAUTION: I would strongly recommend that you not use this function if you have a mixture of Drop-frame and Non-drop timecode or cues. It will almost certainly make a mess of your cues by mixing code modes. It will work fine with either, but I'd avoid a mixture.

5) KEYPAD PBUS TRIGGER SIMULATE

You can now simulate pbus triggers 0-9 by using the keypad on the controller. Press <FCN>, then the number of the trigger you want to simulate. Since I don't have any buttons on the panel to start and terminate a Multi-point loop, this gives you a way to start a Multi-loop from the panel.

For reference, the complete list of trigger assignments is as follows:

(TDC in GVG Switcher Mode)

0	PLAY
1	RECUE
2	VAR PLAY
3	REVERSE PLAY
4	STOP
5	LOOP PLAY (Normal 2-point loop)
6	RECORD
7	PLAY
8	MULTI-POINT LOOP PLAY
9	MULTI-POINT LOOP TERMINATE
10	BANK 000 SELECT
11	BANK 100 SELECT
12	BANK 200 SELECT

(If the TDC is in Sony Swr mode, triggers 0 and 1 are swapped)

6) BANK SHIFT FROM KEYPAD

To make it easier to jump from bank to bank in the registers, you can increment the current register number by 100 by pressing <FCN>, then '+'. Decrement by 100 by pressing <FCN>, then '-'. This might be useful for setting up multi-point loops, or clips you're going to recall in the higher banks using triggers.

7) CUEMAN CLIP NAME FORMAT

If you're downloading cues to a PC using Cueman software, empty clip name registers have posed some problems in the past, because an empty clip name gets changed in Cueman to 8 Spaces. They look the same, but when you try to cue to a clipname of 8 spaces, the machine won't cue.

I've attempted to solve this by outputting empty clip names as 8 asterisks. An empty clip name register will show up in Cueman as *********. When you load this back into the TDC, it will be converted back to an empty clip name register. This should prevent corruption in the upload/download process.

8) CUEUP TIMEOUT

With version 2.0 software, it was possible for the TDC to 'lock up', if a machine couldn't cue for some reason. The controller wasn't really locked up, but was repeatedly trying to cue the machine. There are now limits to how long the TDC will try. I've also greatly improved the error messages, so you should have a much more accurate idea of what's going on if something won't cue.

9) CUEUP TALLYS

The channel buttons will now give you an indication of the cueing process. When a machine is trying to cue, it's channel button (A,B,C,D) will flash rapidly until cueing is completed. In normal circumstances, this will be so quick you'll hardly notice it, but if something is having trouble cueing, the flashing channel button will hopefully help track down which one it is. Once it times out, you'll also get an error message on the display.

10) FLASHING MARK IN BUTTON

If clip store/recall is enabled in the menu, and a register has an inpoint timecode, but no clipname, the MARK IN button will flash to indicate that the clipname is missing. It's still possible to cue using timecode only, even if the button is flashing.

11) PRESERVE LOOP (CH A, B, C D)

There are menu items for turning on the PRESERVE LOOP functions for each channel. If these functions are on, any loop that is playing will not be disturbed by a recall of another register. The only way to terminate a playing loop with PRESERVE LOOP turned on is to issue a STOP command.

12) CLIP FILTER

By setting the CLIP FILTER menu item to a digit (0-9), the TDC will only list the clip names that have the filter character as the first digit. Setting the menu item to OFF will list all available names up to the TDC limit of 99 clips.

This is especially useful with the EVS Spotbox, which typically has a large number of clips available. By using the filter, you can restrict the clips that the TDC lists to only those with a matching first digit.

13) PBUS DATA DISPLAY

There is a menu item (Item 30) which enables a display of the ASCII pbus data for diagnostic purposes. Properly-formatted commands will appear on line 2 of the display when this menu item is on. Improperly-formatted commands will result in a 'PBUS FORMAT ERROR' message. Note that this menu item is always set to off at power-up.

14) FLASHING 'PANEL COMMS' LIGHT ON FRAME

With old software, the PANEL COMMS light on the front of the frame was steadily lit. It now flashes, to indicate normal frame cpu activity. It does not indicate a fault, and should be flashing at about a 2Hz rate when everything is normal. If panel comms fail for some reason, it will go out.

Bug Fixes and other Miscellaneous Stuff

- 1) Faulty Error reporting corrected. Invalid loop messages sometimes identified the wrong machine.
- 2) Dropping of clip name on register modifications fixed.
- 3) Failure to cue C or D in certain modes caused a recue of B.
- 4) Added full memory test at power-up
- 5) Added test for stuck panel switches at power-up
- 6) Device-enable latching logic improved
- 7) Added PVW IN and PVW OUT reset commands to STOP and RECUE sequences.
- 8) Changed manual clip load to 28.31 command.
- 9) TDC won't try to cue with empty registers - 'No Inpoint' err instead.

MENU ITEMS

01 REGISTER LOCK (OFF/ON)

Prevents modification to any registers. The intention is to turn the register lock on after all registers are loaded for a show to prevent inadvertent changes. If you try to mark, copy, trim, etc. any registers with the lock turned on, you'll get a 'Registers Locked' error message.

02 PANEL RECALL (ONLY or w/CUEUP)

When set to 'ONLY', recalling a register from the control panel will only recall the register information; it won't cue the disks to those times. When set to 'w/Cueup', the controller will recall the register and immediately cue the disks to the register inpoints. P-bus recalls will always cue the disks, regardless of this menu setting. This would normally be set to 'Only' when loading the times into the registers, and perhaps to 'w/Cueup' if you're checking the registers from the panel, or using the TDC-100 to do manual playback.

03 OUTCUE ACTION (NONE, STOP, or RECUE)

This item tells the controller what to do when it reaches an outcue. If set to 'None' no action is performed; the machines just keep playing past the outcue. If set to 'Stop', the machines will stop when they reach the outcue, and if set to 'Recue' they will immediately recue to the inpoint and stop.

04 CLIP STORE/RECALL (ON/OFF)

If this item is turned off, the TDC-100 cues machines based only on timecode (or timer). The clip name isn't relevant. If this item is turned on, the name of the current clip is stored when you do a MARK IN, SET IN, or PBUS LEARN, and this clip will be loaded and cued automatically when the register is recalled or cued. Operation of the store/recall function requires that the controlled devices support Odetics protocol. The manual clip list/load functions on the control panel operate regardless of this menu setting.

05 CLIP FILTER (Off, Char = 0-9)

When this item is off, all available clip names will be listed, up to the TDC's limit of 99 clips. When this item is set to a digit (0-9), only clips whose names have a matching first character will be listed. This is especially useful when using the EVS Spotbox server, but will work with any ddr which supports Odetics clips.

06 RECALL DISPLAYS (NAME / TIME)

This item applies only if Item 04 is turned on. If this item is set to NAME, the clip name will be displayed when a register is recalled. If this item is set to TIME, the In Time is displayed when the register is recalled. This menu item only affects the display, all other operation is the same.

07 TIME REFERENCE = (TC/TMR)

Selects 'Tape Timer' counter or timecode as time reference. May not be supported by all disk devices. Global command selects mode for all devices. Note: Odetics mode on the Profile makes the timecode numbers relative to the start of the clip. I find this very confusing, and if the clips don't start at 00:00, you might want to use the TMR mode to avoid this confusion.

08 TIMER MODE = (12/24)

Selects 12 or 24-hour mode for timer.

09 PANEL RECORD LOCK = (ON/OFF)

When ON, prevents all devices from being placed into record mode from the controller front panel.

10 P-BUS RECORD LOCK = (ON/OFF)

When ON, prevents all devices from being placed into record mode via a P-bus command.

11 RECORD TRIM XX FRAMES

Used to set record timing for automatic dub operation. Typically set to 2 frames

12 PANEL BUZZER (OFF/ON/ERR ONLY)

Enables or disables the panel buzzer. 'Off' is completely off. 'On' is on for both error messages, and register changes like Marks and Learns. 'Err Only' is on for error messages only, off for everything else.

13 PRESERVE LOOP CHA (OFF/ON)

When this item is turned on, a loop which is playing on channel A will not be disturbed by a register recall. The loop will continue to play until it is explicitly stopped. If the item is off, recalling a register will abort the loop, and cue the ddr to the new time.

14 PRESERVE LOOP CH B

Same as above for the other channels

15 PRESERVE LOOP CH C

16 PRESERVE LOOP CH D

17 DEVICE NUM FOR A = (00-23, --)

Sets PBUS device number (ID) for the A device. This machine will respond when this number matches the device number sent from the switcher. For commands involving multiple machines, if the device number(s) from the switcher match any of the enabled machines, the commands will be sent to all enabled machines. Setting this item to '-' assigns no device number to channel A, and disables Pbus control of this channel (unless ganged).

18 DEVICE NUM FOR B = Same as above for the other channels

19 DEVICE NUM FOR C =

20 DEVICE NUM FOR D =

21 CH A STATUS (CHECKED / IGNORED)

22 CH B STATUS (CHECKED / IGNORED)

23 CH C STATUS (CHECKED / IGNORED)

24 CH D STATUS (CHECKED / IGNORED)

These cause the TDC-100 to either check or ignore the status returned from the machine. If checked, the controller will make sure a machine is present before trying to cue it, and will wait until cued before rolling in play (if a cueup command has been issued). If set to IGNORE, the controller will send the commands regardless of what the machine is doing. It may be useful to set one or more of these to IGNORED if a machine is powered down, or disconnected. This would allow you to rehearse your effects without modifying the registers. These menu items are set to 'CHECKED' each time the TDC-100 is powered up, and this is the setting that should normally be used.

25 GPI INPUTS (DISABLED/ENABLED)

Enables the (5) GPI Inputs available on the 'RS-232/GPI' connector on the rear panel of the rack frame. These GPI inputs have the following functions:

GPI 0 - Stop

GPI 1 - Play

GPI 2 - Recue

GPI 3 - Recall Register 000

GPI 4 - Recall Register 001

26 GPI OUTPUTS (DISABLED/ENABLED)

Enables the (5) GPI Outputs available on the RS-232/GPI connector. The GPI outputs are triggered when the TDC exits a multi-loop and begins playing the roll-out (or tail) of a multi-loop animation. These GPI outputs have the following functions:

GPI Out 0 - Triggered when Channel A exits a Multi-loop

GPI Out 1 - Triggered when Channel B exits a Multi-loop

GPI Out 2 - Triggered when Channel C exits a Multi-loop

GPI Out 3 - Triggered when Channel D exits a Multi-loop

GPI Out 4 - Triggered when any of the four channels exits a Multi-loop

27 GPI OUTPUTS ACTIVE (LOW/HIGH)

Selects the polarity of the GPI outputs. If item is set to LOW, the outputs will rest high, and will be pulled low when triggered. If item is set to HIGH, they will rest low and will be pulled high when triggered. This item is generally set to LOW.

28 SWITCHER TYPE (GVG / SONY)

Selects type of production switcher TDC-100 is used with. Affects the trigger function numbers (swaps functions 0 and 1).

29 P-BUS PARITY (NONE/ODD/EVEN)

Sets parity mode of P-bus port. Should be set to match production switcher. Baud Rate is always 38.4K

30 PBUS DATA DISPLAY (OFF/ON)

Turning this item on enables a display of received Pbus commands on the TDC's display, to assist in troubleshooting Pbus problems. This item is always set to OFF at power up.

31 COMMAND DELAY = XX FR

Delay inserted between commands sent from controller to devices. Normally set to 00. Set to higher value if device has trouble dealing with commands in rapid succession. Delay time in frames.

32 VIDEO FRAME RATE (25/30)

Selects the video standard being used, in frames per second. For NTSC, 525/60 SDI, and any high-def formats that use 30 frames/sec, or 29.97 frames/sec set this item to '30'. For PAL, 625/25 SDI or other 25 frame/sec standards, select '25'. This setting must match the video frame rate being used in the ddrs. The controller will operate with the wrong standard selected, but all time calculations will be wrong, and confusing things will happen.

There are two more items which may be selected in the menu. These are not menu items, but are just displays (they can't be set by the users).

DEVICE: Displays the type of controlled device, to the extent that the TDC can determine it. If a Profile or Fast Forward is in 'BVW' mode, this item will identify them as 'Sony VTR'. If they are in Non-BVW modes, the TDC will try to report what protocol is selected. The frame rate of the controlled device will also be displayed.

TDC FIRMWARE VERSION: Displays the installed firmware in the TDC frame. This manual applies to version 3.0 firmware.

end