Digitizer 4 (32 program digital delay)

OWNER'S MANUAL

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1.0 INTRODUCTION

Thank you for purchasing the ADA DIGITIZER 4 PROGRAMMABLE DIGITAL DELAY. The DIGITIZER 4 is the first programmable digital delay that provides 32 effect memories, complete programmability of all parameters, instant access to any program, and an optional foot controller for the ultimate on-stage control. To properly set-up and familiarize yourself with your new DIGITIZER 4, read and follow these operating instructions completely.

Also, please take this time to fill in and return your enclosed warranty card.

1.1 FEATURES
- ✓ 16 programs: four Memory Banks of four Programs.
- ✓ 16 factory preset Shadow programs may be recalled at any time.
- ✓ On-board computer allows programming of all effect parameters.
- ✓ Random Access footswitch allows instant access to any program.
- ✓ 1024ms of delay at 16kHz bandwidth.
- ✓ LED READOUT displays delay time or parameter value.
- ✓ Self-diagnostic program checks unit during power up.
- ✓ 256K of internal delay memory. V LED DELAY and SWEEP Rate Indicators for real-time indication of the delay period and sweep speed.
- ✓ Instantaneous logic-controlled FET switching.
- ✓ Simple programming sequence.
- ✓ Stereo outputs.
- ✓ 90dB dynamic range.
- ✓ One year parts and labor warranty.

1.2 PRECAUTIONS
WARNING: To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

CAUTION.   To prevent electric shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

2.0 CONTROL FUNCTIONS

INPUT LEVEL	Boosts or attenuates the input signal.
OUTPUT LEVEL	Adjusts the EFFECT OUTPUT signal level up to +20dBM.
HEADROOM	A 4-step LED meter with a 30dB range which displays signal level relative to clipping level.
BYPASS	Engages or bypasses the delay line. LED indicates effect is bypassed.
PHASE INVERT	Inverts the phase of the delayed signal. LED indicates delay phase is inverted (-180').
REPEAT HOLD	Engages the infinite repeat function (also remotely controllable). LED indicates REPEAT HOLD is engaged.
DELAY (LED)	An LED indicator that "blinks" at the rate of the delay time interval.
SWEEP (LED)	An LED indicator that "blinks" at the rate of the LFO sweep.
LED READOUT	Displays delay time when a program is selected. Displays the value of a selected parameter when in EDIT mode.
▼▲	Decrements or increments (increases or decreases) the value of the selected parameter when in EDIT mode.

DUAL FUNCTION SWITCHES:

IN PLAY MODE

MEMORY BANK	Four switches A, B, C, D, allows Memory Bank selection. Each Memory Bank has four programs within it. The LED's indicate bank selected.
PROGRAM	Four switches 1,2,3,4, allows program selection. The LED's indicate program selected.

IN EDIT MODE

DELAY TIME	Allows continuous adjustment of the delay time in 1ms steps from 1 to 1024ms.
DRY LEVEL	Determines the percentage of dry signal present at the output. Display reads from 0 to 100(%).
DELAY LEVEL	Determines the percentage of delay signal at the output. Display reads from 0 to 100(%).
REGEN LEVEL	Controls the amount of the delayed signal fed back to the input. Display reads from 0 to100(%).
SWEEP DEPTH	Determines the range of delay time swept by the low frequency oscillator (LFO). Display reads from 0 to 100(%).
SWEEP RATE	Sets the speed of the low frequency oscillator that sweeps the delay time. Sweep speed varies from 0.1 sec to 10 sec per cycle. Display reads from 0.1 to 10.0 (Hertz).
EDIT	The master switch that takes the DIGITIZER 4 out of the play mode into the edit mode. Display shows value of selected parameter. The ▼▲ buttons decrease/increase the displayed parameter value. LED indicates EDIT mode is engaged.
STORE	This saves any current program or edited current program in any register. LED indicates STORE mode is engaged.

2.1 REAR PANEL

FUSE	Externally accessible 0.5AMP fuse. Replace with equivalent type and rating only.
POWER SWITCH	ON/OFF rocker switch (located near power supply to prevent the leakage of AC line hum into the audio circuitry).
REMOTE FS-2	Provides remote access to the BYPASS and REPEAT HOLD function. Used with the optional FS-2 DUAL FOOTSWITCH.
REMOTE DS-4	Provides remote access to the BYPASS and PROGRAM selection modes. Used with the optional DS-4 PROGRAM SELECTOR.
OUTPUT B	(INVERT MIX) A 600 ohm, unbalanced output. The level is set with the OUTPUT LEVEL control and carries the mix of dry and inverted delayed signals.
OUTPUT A	A 600 ohm, unbalanced output. The level is set with the OUTPUT LEVEL control and carries the mix of dry and delayed signals.
INPUT	An unbalanced high impedance input which interfaces with low or high impedance sources and low and high signal levels.

3.0 INITIAL SET-UP

The ADA DIGITIZER 4 interfaces with a wide variety of input sources including high level microphones, electronic instruments, and mixing consoles. The input circuitry is high impedance which functions properly with both low or high impedance sources and low (-30dBV) and high (+24dBV) signal levels.

(1) To prepare your DIGITIZER 4 for use, set the rear panel POWER SWITCH to the "OFF" position. Also, set your amplifier's power switch to the "OFF" position.
(2) Connect your DIGITIZER 4's AC POWER CORD to a grounded outlet.
(3) Set the INPUT and OUTPUT LEVEL controls on the DIGITIZER 4 to their minimum, counterclockwise position ("0").
(4) Connect your signal source to the INPUT JACK located on the rear panel.
(5) Connect the OUTPUT A on your DIGITIZER 4 to your amplifier input or mixing console effects receive input. OUTPUT B is used with a second amplifier or effects receive input for stereo effects.
(6) If you own the optional footswitch(es), connect the REMOTE DS-4 jack to the DS-4 PROGRAM SELECTOR with the 1/4" STEREO CORD and connect the REMOTE FS-2 jack to the FS-2 DUAL FOOTSWITCH with the 1/4" STEREO CORD.

3.1 POWER UP SEQUENCE

(1) Select the "ON" position of the rear panel POWER SWITCH of the DIGITIZER 4, then set your amplifier's power switch to the "ON" position.
(2) The DIGITIZER 4 will now step through its SELF-DIAGNOSTIC program, checking a variety of functions for proper operation. If no problem exists, the DIAGNOSTIC operation is completed within eight seconds. Your DIGITIZER 4 is now ready for operation. (If a problem does occur, reference section 5.0 SELF-CHECK DIAGNOSIS for explanation of error codes.)

3.2 INPUT/OUTPUT ADJUSTMENT

(1) To properly set the input level: find the strongest signal or note that you will put into the DIGITIZER 4, and set the INPUT LEVEL control to just barely light the red "0dB" HEADROOM LED. The LED should flicker only on the strongest signals or notes. *Never set the INPUT LEVEL control so the "0dB" LED is constantly ON.* Note that the HEADROOM LED meter monitors all signals entering the delay line. The REGEN LEVEL control may effect the headroom and therefore the readings. While performing, remember to monitor the HEADROOM LED's for possible overloads.
(2) The OUTPUT LEVEL control sets the level of OUTPUTS A and B whether in BYPASS or effect "IN" modes. In general, guitar level signals will require a mid-scale or higher setting, line level signals will generally require positioning the control more counter-clockwise.

Remember, proper setting of the INPUT/OUTPUT LEVEL controls is necessary to achieve maximum performance with the least amount of noise and distortion.

3.3 ACCESSING PROGRAMS

The DIGITIZER 4 is shipped from the factory with 16 Shadow Programs loaded into the Program Storage Registers. As you create your own programs, you erase the Shadow Programs in the Program Storage Registers. However, you can always recall the original factory Shadow Programs at any time, so feel free to experiment.

Programs can be changed in either BYPASS or EFFECT mode. To change to a program within the same bank as the current program, simply press the desired program number button. A single keystroke is required when changing programs only.

To change to a program in another memory bank, press a memory bank location followed by a program number. Before proceeding, reference section 3.5 COPYING SHADOW PROGRAMS to load Shadow Programs.

PROGRAM SELECTION PROCESS

(1) Assuming unit is in BYPASS mode with EDIT and STORE LEDS off, select the BYPASS switch and the effect is "IN".
(2) To change to a chorus effect in your MEMORY BANK, select PROGRAM 2 (this changes to another program in the same memory bank).
(3) To change to another variation of a chorus effect, select another MEMORY BANK location and PROGRAM 2 (remember that when changing the MEMORY BANK, it is necessary to enter a MEMORY BANK location and a PROGRAM number).
(4) After listening to the various shadow programs, you can turn the unit "OFF", or you can proceed and edit a program following the steps outlined in section 3.5.

3.4 EDITING AND STORING PROGRAMS

The EDIT function is used to look at specific parameter settings and to create a program. The STORE function is used to take the program in the Working Register and store it in a specific Program Storage Register.
To save your own programs, you must use the STORE function. If you do not STORE a program that you have edited, it will be erased.

TO EXAMINE PROGRAM PARAMETERS

(1) Select program A4.
(2) Press the EDIT button.
(3) Choose the DELAY TIME parameter. The value 1000 is displayed on the LED READOUT. Next, choose DELAY LEVEL, its value is 90. Continue this process until you have examined all EDIT parameters (all switches surrounded by gray screening). An LED on the parameter switch "blinks" when the parameter has been selected for modification. *Note: when in the EDIT mode, the DS-4 FOOTSWITCH is disabled.*
(4) Select the EDIT button when through examining the parameter values. You will now be brought back to program A4 in effect mode.

TO EDIT AND STORE A PROGRAM

(1) Press the EDIT button
(2) Choose a parameter such as DELAY TIME and decrease or increase its value with the ▼▲ buttons.
(3) Proceed to the next parameter following the same procedure as 2 above.
(4) After all changes are complete, press the red STORE button.
(5) Select the MEMORY BANK and PROGRAM number you want the effect assigned to. The effect is now stored in the assigned location.

WORKING THROUGH AN EDITING EXAMPLE

Let's work through an example of using the EDIT function to create a chorus effect from shadow program C3 (Doubler-Detune).
(1) Select memory location C3 while in the effect mode (i.e., EDIT and STORE LEDs "OFF").
(2) Press the EDIT button.

(3) Select DELAY TIME. Using the ▼ button, change the delay time to 20(ms) from 160(ms).
(4) Select SWEEP DEPTH. Using the ▲ button, change the sweep depth to 60(%) from 50(%).
(5) Select SWEEP RATE. Using the ▲ button, change the sweep rate to 3(sec) from 1 (sec)
(6) Select REGEN LEVEL. Using the ▼ button, change the regen level to 0(%) from 20(%).
(7) Select DRY LEVEL. Using the ▼ button, change the dry level to 60(%) from 80(%).
(8) Keep DELAY LEVEL at 60(%). We have now adjusted all parameters as required and need to store the new program to a memory location.
(9) Select the red STORE button.
(10) Lastly, store the new chorus effect in memory location MEMORY BANK C, PROGRAM 3.

3.5 COPYING SHADOW PROGRAMS

The 16 shadow programs are permanently stored in PROM. You can transfer any individual shadow program into any memory location or you can move all 16 programs at once.

TO COPY AN INDIVIDUAL SHADOW PROGRAM

(1) Press EDIT button followed by MEMORY BANK A button. This calls up the shadow programs.
(2) Select any of the 16 shadow programs to use or modify. For example, selecting C3 calls up a copy of the original Doubler-Detune into the working register.
(3) To store shadow C3 onto an effect memory location, select STORE followed by the desired memory bank and program number.
(4) To modify the copy of shadow C3, perform the steps outlined in 3.4 EDITING OR STORING PROGRAMS.

TO COPY ALL 16 SHADOW PROGRAMS

(1) Press EDIT, MEMORY BANK B, then the REPEAT HOLD button . This copies all 16 Shadow Programs into the main Program Storage Registers at one time.
Important: by transferring all 16 Shadow Programs, any programs you have created will be erased.

3.6 HOW ARE PROGRAM MEMORIES ORGANIZED?

The program memories of the DIGITIZER 4 are organized as follows: 16 Program Storage Registers, 16 Shadow Program Storage Registers, and one Working Register. Each of the 32 Program Registers can be accessed and moved into the "holding area" called the Working Register. The Working Register holds . the program you are listening to and allows examination or editing of the program's parameters. You can save or STORE a program you have created by copying it to one of the 16 Program Storage Registers for later recall. You cannot STORE programs to the 16 Shadow Program Registers as they hold permanent, factory pre-set programs.

The DIGITIZER 4's microprocessor remembers the last program used. When powered up, it will place that program into the Working Register in the BYPASS mode.

4.0 DELAY TIME

By using the DELAY TIME button in conjunction with the ▼▲buttons, the delay time is variable from 1 ms to 1024ms.

FIGURE 4-1
RECOMMENDED DELAY TIME RANGES

EFFECT	DELAY TIME (in ms)	
	MIN	MAX
Flange	1 -	8
Chorus	5 -	30
Double	30 -	100
Short Echo	100 -	256
Long Echo	256 -	1024

4.1 DRY LEVEL AND DELAY LEVEL

The DRY LEVEL and DELAY LEVEL buttons control the mix of dry and delayed signal at the outputs. As the amount of DRY LEVEL is increased, the amplitude of the dry signal is increased. Similarly, as the DELAY LEVEL is increased, the amplitude of the processed signal is increased.

Proper setting of the delay and dry signal levels are dependent on the particular parameter settings of the effect. Because of the effects of comb-filtering which cancels different frequencies at different delay times, and the additive effects of using REGEN, proper adjustment of the DRY LEVEL and DELAY LEVEL controls varies for each effect.

Experimentation is required with the DRY LEVEL and DELAY LEVEL controls as they can radically change the texture of the effect. For example, you can make a discrete echo sound louder and thus more hard edged than the original signal or you can take the edge off of a simulated reverb by mixing in smaller percentages of delay [20-60(%) of DELAY LEVEL to 60-80(%) DRY LEVEL].

For studio applications where your DIGITIZER 4 is in an effects loop, the DRY LEVEL will be set at 0(%) and the DELAY LEVEL at 100(%). The processed signal level (and thus the dry/effect mix) is now controlled at the console.

4.2 REGEN LEVEL

As the REGEN LEVEL is increased, more of the delayed signal is sent back to the input of the DIGITIZER 4. When using short delay settings, from 1 to 40ms, REGEN LEVEL adds emphasis or resonance to flanging and chorusing. At longer time delays, from 64 to 1024ms, REGEN LEVEL adds repeat echoes extending to 60 seconds or more.

4.3 SWEEP DEPTH AND SWEEP RATE

The SWEEP DEPTH button allows you to fade between a static delay setting and the sweeping voltage of the internal low frequency oscillator. When the SWEEP DEPTH control is set at "0", the delayed signal is not swept and the delay time remains stationary. As the SWEEP DEPTH is increased a wider range of the selected time delay is swept. With the SWEEP DEPTH set at 100(%), the full 4:1 range is swept.
The SWEEP RATE button adjusts the speed of the low frequency oscillator from 0.1 sec to 10 sec. Extremely slow sweeps (>2sec) are useful for chorusing, flanging, and subtle

doubling effects. Faster sweeps can produce vibrato, fast flanging, and rotating speaker simulation.

4.4 PHASE

The delayed signal's phase is inverted when the PHASE pushbutton is engaged. LED indicates phase is inverted.' "Inverted phase" may correct phasing problems in mixing consoles, or alter the tonal characteristics of short delay effects such as resonant flanging and doppler chorusing.
PHASE is not programmable.

4.5 REPEAT HOLD

When engaged, the REPEAT HOLD pushbutton will capture and indefinitely repeat the signal stored in memory without any loss of audio quality. Up to 1024ms of a musical passage may be repeated as a counterpoint or a background rhythm in the repeat hold mode. An LED indicates repeat hold is engaged. The trick to using repeat hold is to play the phrase you want to repeat, then carefully choose the moment to select REPEAT HOLD. Timing is critical. When your DIGITIZER 4 is initially powered up, an internal protection circuit defeats the repeat hold function to prevent "howling".
REPEAT HOLD is not programmable.

4.6 REMOTE FUNCTIONS

The DS-4 PROGRAM SELECTOR is a remote footswitch that accesses BYPASS, MEMORY BANK, and PROGRAM number. You can go from program to program directly without stepping up and down or sequencing through programs. Also, by simultaneously pressing BYPASS and a PROGRAM number on the PROGRAM SELECTOR, memory banks are remotely changed. LED's on the footswitch indicate the status of effect in use or ready for use.

The FS-2 DUAL FOOTSWITCH provides remote control over BYPASS and REPEAT HOLD. The REMOTE jacks on the rear panel of the DIGITIZER 4 accept standard 1/4" stereo cords (tip-ring-sleeve). The DS-4 and FS-2 come complete with 20' stereo cables.
Important: footswitch(es) must be connected to the appropriate rear panel jack for proper operation.

5.0 SELF-CHECK DIAGNOSIS

The DIGITIZER 4's self-diagnostic program checks the unit for errors during power-up. This interactive feature pin-points the source of problems to simplify correcting the problem or servicing. For example, if a problem occurs with a footswitch, an error code is displayed on the LED READOUT which allows you to determine specifically which footswitch or footswitch cord is bad.

There are two types of codes in the program: Warning/ Proceed and Warning/Abort codes. Warning/Proceed codes indicate a problem has occurred that will not hinder operation of the main unit. Warning/Abort codes signal that a serious problem exists and will prevent the unit from operating further. Warning/ Abort codes rarely occur, but should they, the diagnostic program facilitates expedient repair. Should a Warning/Abort code occur, the unit will prevent you from further use until the [problem has been repaired by an authorized technician.

WARNING/PROCEED CODES

SOURCE	DESCRIPTION	CODE
FS-2 Footswitch	Defective switch or cord or wrong connection.	F
DS-4 Footswitch	Defective switch:	
	Position 1	P08
	Position 2	P18
	Position 3	P30
	Position 4	P60
	Position 5	PC1
Internal Memory	Check sum error; stored program contains error *	CA1 **

WARNING/ABORT CODES

SOURCE	DESCRIPTION	CODE
Microprocessor	Shift register error; microprocessor cannot send program parameters.	Sr
Internal Memory	Memory read/write error; problem with copying from Storage Register to Working Register.	Sr

*   Check sum error code prevents use of a damaged program. The DIGITIZER 4 will not abort, but will display the error code for one second then default to program A1.

**   Check sum error is indicated by a "C" followed by a space and the program's Memory Bank and Program number.

5.1   BATTERY
The DIGITIZER 4 uses a 3 volt battery which supplies power for program storage. Expected battery life is 10 years. Should replacement be necessary, contact a qualified service technician.

5.2   INPUT/OUTPUT CABLING
The STEREO CORD from the optional DS-4 PROGRAM CONTROLLER is a computer link and should be kept away from the audio input and output cables to prevent noise.

6.0 PATCH SETTINGS

(The following 16 patch settings are loaded into the Shadow Program Storage Registers.)

PRGM NO	DESCRIPTION	DELAY TIME	DRY LEVEL	DELAY LEVEL	REGEN LEVEL	SWEEP DEPTH	SWEEP RATE
A1	Stereo Classic Flange	2	60	60	0	100	.1
A2	Stereo Slow Chorus	12	*60	60	0	60	.1
A3	Stereo Doubling	40	100	75	0	0	-
A4	1000ms Echo	1000	100	90	0	0	-
B1	Stereo Flange w/Regen	3	50	50	75	100	.1
B2	Stereo Fast Chorus	16	60	60	0	50	.2
B3	Bathtub Reverb	80	80	60	40	0	-
B4	320ms Echo	320	100	90	0	0	-
C1	Stereo Fast Flange	5	60	60	20	50	1.2
C2	Stereo Thick Chorus	40	60	60	0	50	.2
C3	Detune Doubling	160	80	60	20	50	-
C4	900ms Repeat Echo	900	100	90	90	0	-
D1	Stereo Static Flange	1	60	60	50	0	-
D2	Stereo Wide Sweep Chorus	30	60	60	50	100	.1
D3	Double w/REGEN	120	80	70	50	0	-
D4	1024ms Echo w/Regen & Sweep	1024	100	80	50	20	.1

7.0 SPECIFICATIONS

DELAY RANGE   1 to 1024ms
BANDWIDTH, DRY   10Hz to 20kHz
         DELAY   20Hz to 16kHz
DYNAMIC RANGE   90dB
MEMORY SIZE   256k RAM
DISTORTION (THD) @ 1kHz   dry, 0dBV, 0.02% max.
                                                     wet, 0dBV, 0.05% max.
MODULATION DEPTH   0 (none) to 4:1
SWEEP SPEED   0.1 sec to 10 sec
MAX. INPUT LEVEL   +20dBM (ref. .775VRMS)
MAX. OUTPUT   +20dBM (ref. .775VRMS)
INPUT   Single ended, 1/4" phone jack handles instrument & line level signals, 500k ohm input impedance.
OUTPUT(S)   Two: Mix and Invert Mix, single ended, 1/4" phone Jacks, drives 600 ohms.
REMOTE SWITCH LOGIC   Grounding terminal engages
POWER CONSUMPTION   12 watts
POWER   120VAC,50/60Hz
DIMENSIONS   L-10.5" x W-19" x 1.75" (483 x 44 x 269mm)
WEIGHT   6.75lbs.-.(2.95kg);10lbs (4.55kg) shipping
OPTION   220 or 240VAC, 50/60Hz
ACCESSORIES   DS-4 PROGRAM SELECTOR*
                                     FS-2 DUAL FOOTSWITCH*
                                      *(Includes 1/4" STEREO CORD)

All specifications subject to change without notice.

8.0 BLANK PATCH FORM

PRGM No. DESCRIPTION	PHASE	HOLD	DELAY TIME	DRY LEVEL	DELAY LEVEL	REGEN LEVEL	SWEEP DEPTH	SWEEP RATE