OWNERS MANUAL
version 2

TC 1280
STEREO DIGITAL AUDIO DELAY

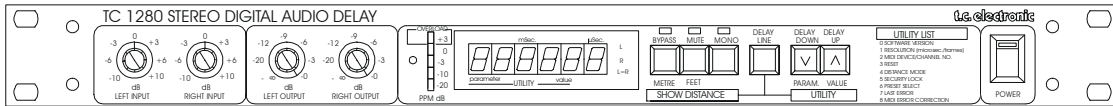**Contents**   **Page**

TC1280 STEREO DIGITAL AUDIO DELAY

The TC 1280 STEREO DIGITAL AUDIO DELAY is a high resolution audio delay based on the **proprietary converter technology** that made the TC2290 Dynamic Digital Delay a world standard in the recording industry. Two independently controlled audio channels make the TC1280 ideally suited for any system requiring precise control over audio delay. Uses include concert delay towers, balcony delay in theatres, mastering delay, audio for video format conversion, matching of video processing delays, etc. anywhere that high quality time delays are desired with minimum effect to signal quality.

FEATURES:

- No degradation of signal quality .The TC digital converter technology has been acclaimed as being **"very musical and warm".**

- Soft HF roll off: -3dB @ 25 kHz and -12 dB @ 33 kHz allows ALL the signal to pass thru the device.

- Dynamic range > 100 dB is excellent for live sound performances.

- Absolute stereo phase linearity within 2 microseconds.

- Delay time increments adjustable down to 5 microseconds for exact adjustments needed when aligning speaker driver components.

- Expandable memory up to 2 x 10 seconds.

- Front panel controls are lockable for permanent installation.

- Remote control possible via MIDI or dedicated switches. (TC0050 footswitch allows access to presets).

- Delay times may be displayed and adjusted in time, or distance (meters or feet), or video frames (25half or full frame, and 30half or full frame).

- Automatic relay bypass of audio should there be a loss of power.

- Non-volatile memory of delay time settings in 4 presets.

FRONT PANEL KEYS AND FUNCTIONS

<POWER>	Mains power on/off switch. During start up, the unit will display the software revision number. Note: the audio signal input is connected directly to the output by a relay when power is not on.
LEFT INPUT	Input gain of left channel. -10dB to +10dB.
RIGHT INPUT	Input gain of right channel. -10 dB to + 10 dB.
LEFT OUTPUT	Output volume of left channel. 0dB to mute
RIGHT OUTPUT	Output volume of right channel. 0dB to mute
PPM	Peak program meter for both left and right channels. When "DELAY LINE" is adjusted for left, the PPM will display the left channel. When "DELAY LINE" is adjusting for right, the meter will display the right channel. When "DELAY LINE" is adjusted to L= R (left = right) the PPM will display the audio channel which is highest.
OVERLOAD	The OVERLOAD LED +3 will **always** display a overload on either left or right channel.
BYPASS	Delay bypass on left and right channels. Sets the delay time to 0 seconds. (This is not a relay bypass)
MUTE	Mutes both channels at output.
MONO	Mixes left and right inputs to a mono signal.
DELAY LINE	Switches between 3 positions L, R or L=R. Left channel (L) displays the delay time of left channel. Right channel (R) displays the delay time of right channel. Left = right (L= R) displays the delay time of both channels alternatively.
DELAY DOWN	Decreases delay time for the displayed channel (or both if L=R displayed).
DELAY UP	Increases delay time for the displayed channel (or both if L=R displayed).
SHOW DISTANCE METRE	Press the "DELAY LINE" and the "BYPASS" keys simultaneously in order to get the delay displayed in meters. Press the "DELAY LINE" or "DELAY UP" / "DELAY DOWN" to get back to time display. *Note: If UTILITY PARAMETER 4 is set to VALUE 1 you can adjust the delay time in SHOW DISTANCE mode*
SHOW DISTANCE FEET	As above, but press the "DELAY LINE" and the "MUTE" keys simultaneously in order to get the delay displayed in feet.
UTILITY	Please refer to UTILITY FEATURES.

PRESETS

The TC 1280 has 4 presets. Just make your delay setting, and these values will remain as a preset until changed. Select another preset number (UTILITY PARAMETER 6, VALUE 1 - 4) and adjust the delay time. Both are now selectable by recalling the appropriate preset number by MIDI or by remote.

Note: The preset no. received on the MIDI IN is passed to the MIDI OUT on the same channel. Thus allowing daisy chaining of several TC1280s, TC1380s and other MIDI equipment.

MIDI

Set the UTILITY PARAMETER 2 to the appropriate MIDI channel / device number. Recall the desired preset by MIDI program change command.

The bypass status of the TC1280 can be set with MIDI Controller #0: value 0-63 = BYPASS, value 64-127 = active.

MIDI SYSEX documentation is available on request. Please contact your local TC distributor.

REMOTE

By using the remote facility on the rear panel the TC 1280 can change presets and bypass status with the TC 0050 remote pedal *(Note: The TC0050 have been discontinued).*

The TC0050 schematic is found below:
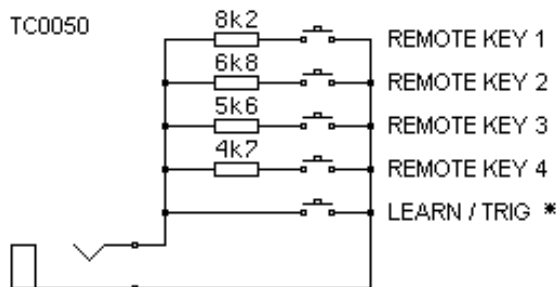
Any of the keys can be omitted.
Several remotes can be paralleled.
Max. cable lenght w/ properly shielded cable: >100m
*TC1280: Bypass / TC1380: No function

Resistors: 1/4W 5% types
Switches: momentary types (door-bell)

Note: The preset no. selected with the remote is sent as MIDI program change command to the MIDI OUT. Thus, several TC1280s, TC1380s and other MIDI equipment can be remotely controlled by one TC0050.

**UTILITY FEATURES (extra options and settings)**

You can access a whole extra group of parameters and features within the TC 1280 by simply pressing two buttons at the same time. PARAMETER selects what type of feature you want to adjust, and VALUE selects the choice.

PARAMETER   Press "DELAY LINE" and "PARAM" simultaneously to access the utility parameter number. Then select the parameter number by pressing the up/down keys.

VALUE   Press "DELAY LINE" and "VALUE" simultaneously to access the utility value number. Then select the value number by pressing the up/down keys.

PARAMETER	VALUE	FUNCTION
0	Read only	Display the software revision number.
1	200/500/1000 microseconds or frame select	Delay step resolution or frame view select.
2	0-99 0 = MIDI off	MIDI channel / device number.
3	80	80 = Reset when turning unit off/on.
4	0-1	0 = Show distance only. 1 = Show and adjust distance A. Dot in display flashes when the display is set for distance.
5	on/off	Security lock.
6	1-4	Preset No.
7	Read only message.	Displays last error

REAR PANEL
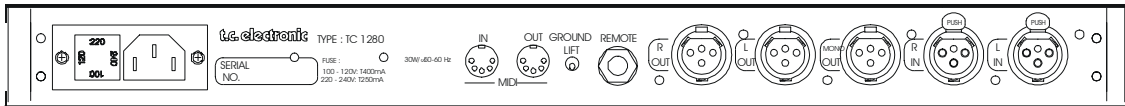
L IN (left input)	Left channel input. XLR balanced, pin 2 hot.
R IN (right input)	Right channel input. XLR balanced, pin 2 hot.
MONO OUT	Mono output: Sum of left and right inputs after input gain.
L OUT (left output)	Left channel output, XLR balanced, pin 2 hot.
R OUT (right output)	Right channel output, XLR balanced, pin 2 hot.
REMOTE	TC 0050 remote input. Please refer to page 4.
MIDI IN	MIDI input.
MIDI OUT	MIDI output.
GROUND LIFT	Disconnects chassis from audio ground.
FUSE	External fuse holder, replace only with the correct type according to mains voltage. Please refer to rear panel.
MAINS INLET	IEC mains inlet. Make sure that the voltage selector and fuse type set correctly according to your mains supply.

MEMORY EXPANSION

The TC 1280 can be expanded on the main circuit card in steps of 625 mS per channel by using the CH01 memorv expansion kit.

1250 mS per channel:	Install memory chip in position IC31. Switch dip switch position 1 to ON.
1875 mS per channel:	Install memory chips in position IC31 and IC32. Switch dip switch position 2 to ON.
2500 mS per channel:	Install memory chips in positions IC31 and IC32, and IC33. Switch dip switch 1 and 2 to ON
For further expansion:	Purchase the ME80 option. Instructions will come with the option.

ERROR MESSAGES

The last error message number will be displayed if UTILITY 7 is selected. The values mean the following:

VALUE	DESCRIPTION
13	The unit has made a reset.
15	Security lock is activated.
17	You are trying to change the value of a read only parameter.
27	MIDI input error.
57	Main board and Digital board have been separated or battery voltage is low. At power on CPU standby bit is missing, therefore a Master reset is done. All settings = factory default.
58	Main board and Digital board have been separated or battery voltage is low. Check also CPU. At power on checksum in non voilating parameters is wrong, therefore a Master reset is done. All settings = factory default.
All OTHER	Mainly used for service purposes. Please contact your local TC distributor.

DISTANCE MODE CALCULATION

The show distance value corresponding to the delay time setting is based on 344 meters/Sec or 1129 feet/Sec which is the speed of sound in air at 20°C and 60% humidity.

The equation for the delay time is:

$$time = \frac{distance}{c}$$

where "c" is the speed of sound in air

A convenient formula for the speed of sound in air is:

$$c = 20\sqrt{273 + T}$$

T in Centigrade and c in meters/sec

or

$$c = 49\sqrt{459 + T}$$

T in Fahrenheit and c in feet/sec

The speed of sound in air at a temperature of 0 degrees C and 50% relative humidity is 331.6 m/s. The speed is proportional to the square root of absolute temperature and it is therefore about 12 m/s greater at 20 degrees C. The speed is nearly independent of frequency and atmospheric pressure but the resultant sound velocity may be substantially altered by wind velocity.

Temp Humidity	12°C 53,6°F	14°C 57,2°C	16°C 60,8°C	18°C 64,4°F	20°C 68°F	22°C 71,6°F	24°C 75,2°F	26°C 78,8°F	28°C 82,4°F	30°C 86°F
40%	339,0	340,2	341,4	342,6	343,9	345,1	346,3	347,6	348,8	350,1
60%	339,1	340,4	341,6	342,9	344,1	345,4	346,7	348,0	349,2	350,6
80%	339,3	340,5	341,8	343,1	344,4	345,7	347,0	348,3	349,7	351,0

Temp Humidity	12°C 53,6°F	14°C 57,2°C	16°C 60,8°C	18°C 64,4°F	20°C 68°F	22°C 71,6°F	24°C 75,2°F	26°C 78,8°F	28°C 82,4°F	30°C 86°F
40%	1112	1116	1120	1124	1128	1132	1136	1140	1144	1149
60%	1113	1117	1121	1125	1129	1133	1137	1142	1146	1150
80%	1113	1117	1121	1126	1130	1134	1138	1143	1147	1152

Comment on HAAS EFFECT

- or the "principal of first arrival". Most of us are born with the gift of being able to hear quite easily from where in a circular sphere around us a given sound originates. As most of us are born with two ears spaced apart, separated by a head, the direct sound from any source will arrive at slightly different times to each ear. Even in a strong reverberant ambience our brain is capable of ignoring the reflections and tells us the direction to the source. The Haas effect implies also to stereophonic reproduction from only two loudspeakers.

In essence we do not "hear" the delayed sound if the subsequent arrivals are within 30 milliseconds. If the later arrivals are longer than this, two separate sounds are perceived. The Haas effect is true even when the second arrival is louder than the first (even by as much as 10 dB).

TECHNICAL SPECIFICATIONS

INPUT/OUTPUT

Connectors:	XLR balanced (pin 2 hot)
Input Impedance (balanced):	20 kOhm
Max. Input Level (balanced):	+22 dBu
Input Gain adj.:	±10 dB
Output Impedance (balanced):	50 Ohm
Max. Output Level:	+22 dBu
Output Gain adj.:	0 to -70 dB
Dynamic Range:	> 100 dB
THD+N:	< -66 dB (0.05%) @ 1 kHz, 0 dBu
Frequency Response:	20 Hz to 20 kHz, +0/-0.5 dB
Group Delay:	< 5 µs
Digital Conversion:	Dynamic Differential 18 bit resolution A D / D A
Sample Rate:	1 MHz
Processing Delay:	30 µs

CONTROL INTERFACE

MIDI:	In/Out: 5 Pin DIN, SYSEX implemented
Remote:	1/4" phone jack

GENERAL

EMC Complies with:	EN 55103-1, EN 55103-2, FCC part 15 class B, CISPR 22 class B

SAFETY

Complies with:	IEC 65, EN 60065
	32°F to 122°F (0°C to 50°C)
Operating Temperature:	
Storage Temperature:	-4°F to 140°F (-20°C to 60°C)
Finish:	Anodized aluminum front, Plated cadmium coating steel chassis
Dimensions:	19" x 1.75" x 11.6" (483 x 44 x 294 mm)
Weight:	11 lbs. (5 kg)
Shipping Weight:	14 lbs. (6.4 kg)
Mains Voltage:	100/120/220/240 VAC, 50/60 Hz (selectable)
Power Consumption:	<30 W
Warranty Parts and Labor:	1 year

OPTIONS

ME80:	Memory expansion card (empty, with sockets for 12 x CH01)
CH01:	1.25 sec. memory expansion

Note: Due to continuous development and standardization all specifications are subject to change without notice.