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2TOOLS™ MANUAL

For use with version 2.2 software. 12dec2007

Revision History

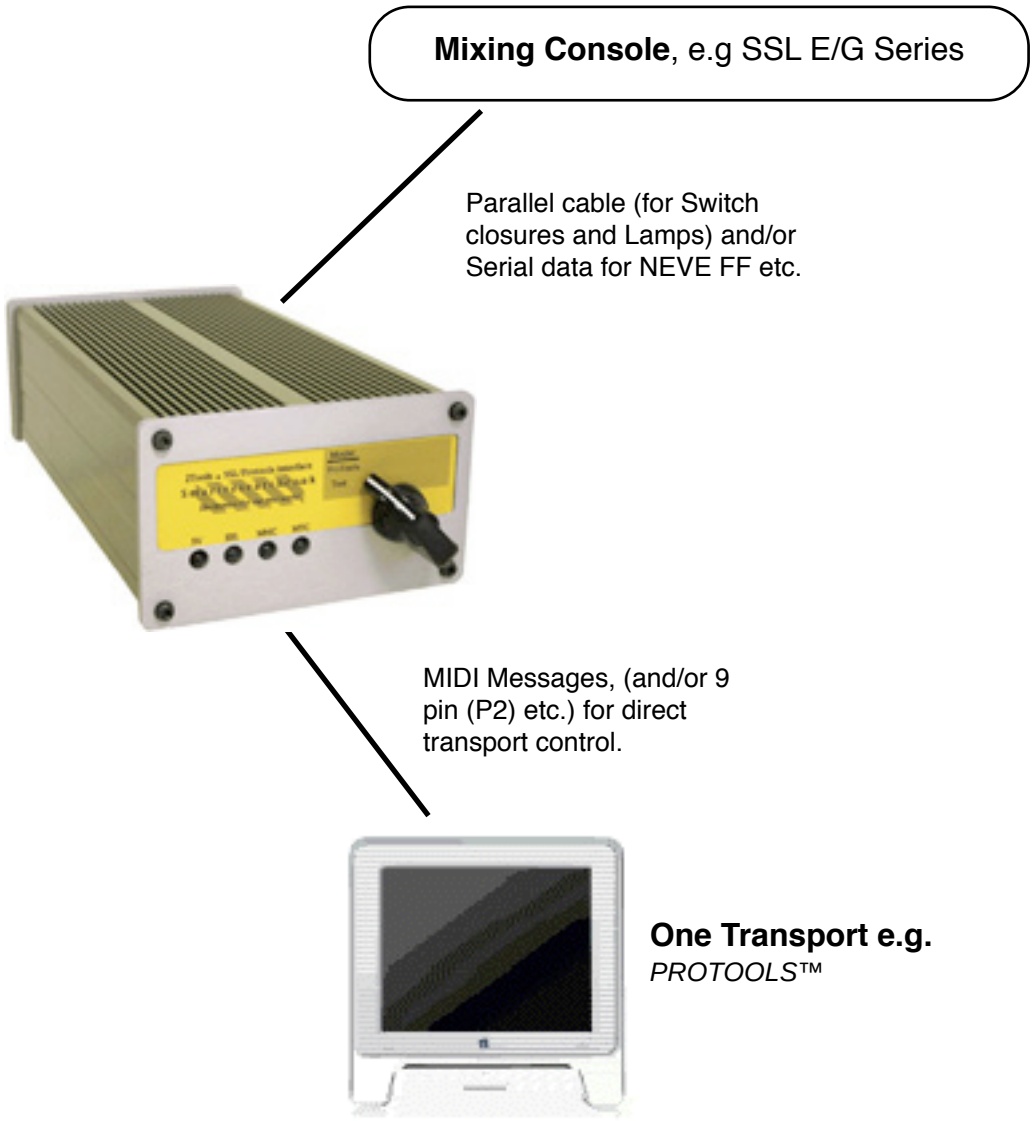
Revision 18 change from CS10 to HUI midi protocol. (12dec07)
for 2Tools software v2.2U, and PT v7.3.1
Revision 17 additions for OSX and PT v6.7 (20apr05)
Revision 16 Revision for v1.4U - Factory fitted ROM.
Revision 15.1 SSL page revised.
Revision 15 Imported new graphical illustrations.
Revision 14 Updated SSL pages.
Revision 12 Incorporating *PROTOOLS*™ version 5.1 screen shots.
Revision 10 First production release of manual.

CONTENTS

1. BASIC SYSTEM DIAGRAM

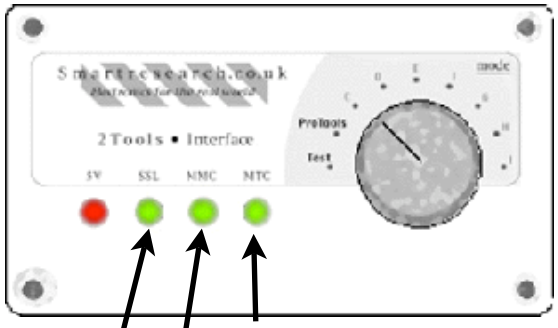
- 2TOOLS™ takes parallel transport switch closures from mixing consoles and turns them into Transport control messages (via Midi for *PROTOOLS*™, or Serial data for some other options)

- 2TOOLS™ translates transport information from systems such as *PROTOOLS*™ into tach, direction & lamp signals for a mixing console and its associated automation system.



2. 2TOOLS

2.1 2Tools Front Panel Controls - V2.2U



Rotary Switch Settings:

Test---------	Lamp & Switch Tests
ProTools---	*PROTOOLS*™
C ----------	trial setting MMC
D ----------	trial setting 9 pin (P2)
E ----------	trial setting 9 pin (using Pause)
F ----------	superceded *PROTOOLS*™
G ----------	not defined in this version
H ----------	not defined in this version
I ----------	not defined in this version

MTC LED
Indicates that MIDI TIME CODE (MTC) is being received. Flashing indicates syncing or intermittent MTC, solid indicates good MTC.

MMC LED
Indicates a valid MIDI or *PROTOOLS*™ message (reply) was received.

CONSOLE (SSL) LED
Indicates when a transport switch has been detected. The LED stays on while the switch is closed and goes out when switch is released. When interfaced to a serial Mixing Console (e.g. NEVE FF) the CON LED will flash when receiving any messages.

WHAT DO THE VARIOUS SETTINGS DO?

Except for testing, this control would normally be left set in the chosen mode for your setup:

Test This shuts down all communication and flashes the LEDS on 2TOOLS™ and SSL transport lamps, the sequence of these indicates the software version. *see Appendix B.* The switches can be manually tested and the lamps are held in the state of the switch press. This mode can also be used to 'reset' any downloaded software running in RAM.

ProTools In this mode MIDI CONTROLLER messages are used to produce the Play, Stop, Record and Wind functions. In play, 2TOOLS™ locks the TACH output signal to the in coming MTC. From software v2.2U (dec07) this is now using the ProTools HUI protocol.

C (*preliminary trial setting only)* In this mode MIDI MACHINE CONTROL messages are used to control an MMC transport. (DA88 etc.)

D (*preliminary trial setting only)* Here standard 9 pin control protocol messages are used to control a 9 pin compatible transport via the **RS422** connector. (MFX-3, RADAR 1&2, Betacam, 3348 etc.)

E (*preliminary trial setting only)* As **D** but using Pause in place of Stop.

F Superceded *PROTOOLS*™ setting for CS10 record protocol. Slower MIDI messages. may avoid filling up *PROTOOLS*™ MIDI buffer. Also avoids sending some stop commands. Please see earlier v1.4U manual for set up information.

2.2 2Tools - Rear Panel And Connectors

The **2TOOLS™** MIDI OUT, connects to your Transport defined MIDI MACHINE CONTROL input port. It supplies the MMC and additional MIDI messages to your Transport.

MIDI OUT

5 way DIN Socket	
nc	01
GND	02
nc	03
Tx+	04
Tx-	05

The **2TOOLS™** MIDI IN, connects to your Transport defined MIDI TIMECODE output port – whatever that may be.

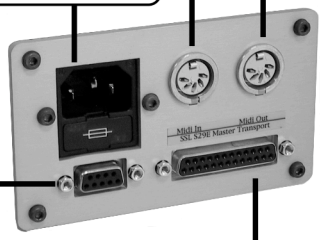
MIDI IN

5 way DIN Socket	
nc	01
nc	02
nc	03
Rx+	04
Rx-	05

Mains Inlet

Universal AC mains IEC input socket.

Auto ranging AC voltage input:
100 - 240 volts, 15 watts
Fit only 250v 500mA type T, slow blow fuse.



This connector has multiple future purposes: *(NEVE "Flying Faders" and "Encore", or 9 pin machine control)*

RS422 Connector

9 way D FEMALE			
GND	01	06	GND
Rx-	02	07	Rx+
Tx+	03	08	Tx-
GND	04	09	GND
nc	05		

S29E Connector

25 way D FEMALE			
nc	01	14	*nc*
LAMP common +20V	02	15	SWITCH common
RWD Switch	03	16	RWD Lamp
FWD Switch	04	17	FWD Lamp
STOP Switch	05	18	STOP Lamp
PLAY Switch	06	19	PLAY Lamp
nc	07	20	*nc*
RECORD Switch	08	21	RECORD Lamp
TACH	09	22	TACH Common
DIRECTION	10	23	DIRECTION Common
nc	11	24	*nc*
nc	12	25	*nc*
nc	13		

Connects to your mixing console remote connector.

NOTE: There are two versions of the rear panel. The later version (not shown) has an ON/OFF switch and the MIDI connectors are in slightly different positions. Both versions are fully compatible.

3. SSL E/G SERIES

3.1 SSL E/G Installation

1. Attach the supplied 25 way D cable from 2TOOLS™ to the SSL CONSOLE REMOTE (MASTER REMOTE S29E - usually found under the SSL patchbay).
2. Patch the LTC (SMPTE) output from your transport to the SSL READER INPUT on the patchbay.

SSL 4000, 6000.
with E or G Series
Automation System

TIMECODE PATCHING
The SSL Automation System needs to see LTC (timecode) from your transport when in play.This is achieved by taking LTC out from your transport to the SSL patchbay - READER INPUT.Timecode should only be active to the SSL when your transport is in play.

25 way cable. (supplied)
see Appendix C

LTC output (Timecode / SMPTE) to
SSL patchbay. (SMPTE Reader)

Transport e.g.
PROTOOLS™

TACH & DIRECTION
At play speed 2TOOLS™ generates frame rate tach pulses for the SSL, based on the incoming MTC from the connected transport.

Wind speed tach and direction (FFWD and FRWD) are derived from the virtual tape machine in 2TOOLS™ which in turn controls the wind speed of the Transport, and is located by the SSL Automation System. In some of the rotary switch settings the Transport will control its own wind speed.

S29E, and TRANSPORT SWITCHES
The SSL Automation System gets tach & direction signals from 2TOOLS™ via the S29E cable (a male 25 connector usually under the console patchbay). Normally, 24v bulbs are fitted in the console transport switches. 2Tools provides 18v signals for these for longevity.

The 5 transport switches and lamps can be tested to check the correct connections have been made by using 2TOOLS™ TEST MODE. (*see Section 2*).

3.2 SSL E/G Computer Setup

To connect 2TOOLS™ to the SSL **E** or **G** series computers as a normal tape machine, you need to set up a new SSL Master Tape Machine page. Here are the best settings we have found:

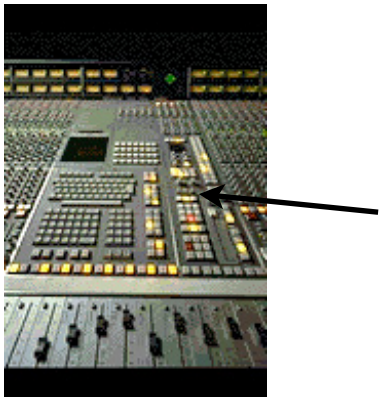
E SERIES MASTER MACHINE PAGE

Autolocate type	3
Autolocate decision interval	0.02
Forward direction sense (L/H)	LOW
Multi play speeds (Y/N/S)?	NO
Pulses/second at 15 ips or at std. Play speeds	25/30/24
Target window	1.00
Drop-out command type	1
Drop-in command type	1
Drop-in rehearse hold-off	8
Time for machine to startup	3.00
Time before sure tape stopped	0.10
Pessimism factor (fwd)	150
Pessimism factor (bkwd)	150
Short locate time (secs)	1
Max stopping distance	0

G SERIES MASTER MACHINE PAGE

The SSL G series is very similar to E series, with the exception of the frame rate setting.

Autolocate type	3
Autolocate decision interval	0.02
Forward direction sense (L/H)	LOW
Multi play speeds (Y/N/S)?	NO
Pulses/second at std. Speed	FRAME
Target window	1.00
Drop-out command type	1
Drop-in command type	1
Time for machine to startup	3.00
Time before sure tape stopped	0.10
Pessimism factor (fwd)	150
Pessimism factor (bkwd)	150
Short locate time (secs)	1
Max stopping distance	0
Frames to stop from play	0.10
Frame jog card fitted	NO



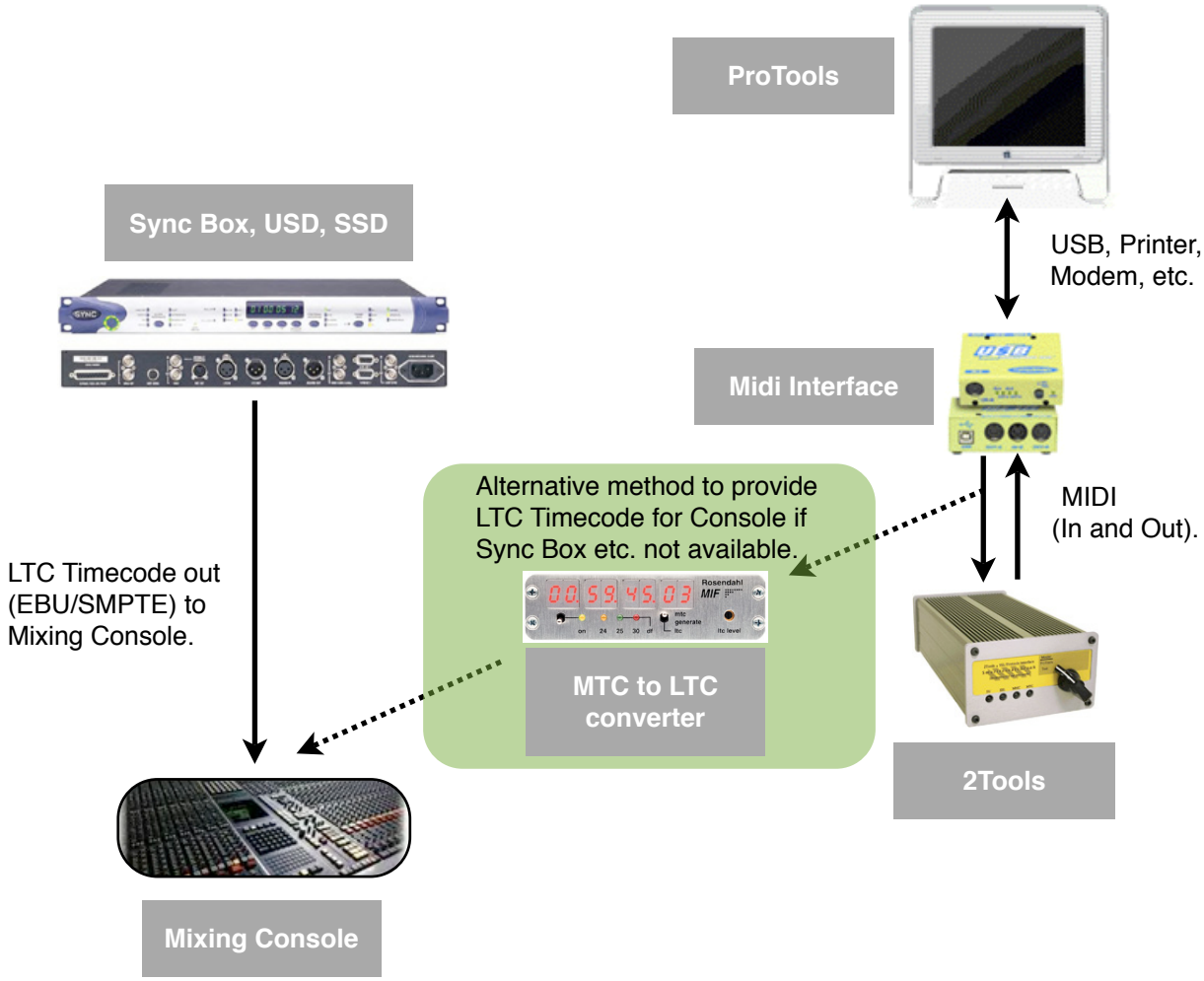
NOTE: Make sure that the SSL **TAPE ENABLE** button is selected (this is located close to the **RECORD ENABLE** button).

4. PROTOOLS

4.1 ProTools Overview And Connections

Your *PROTOOLS*™ system will need both MIDI IN and OUT connections set up via a suitable MIDI interface. Timecode will also need to be derived from *PROTOOLS*™ to feed to the console's LTC reader input. Normally, the LTC generated by an HD SYNC UNIT; SSD; or USD is used.

If a Sync Box or USD etc. is not available, it may also be possible to use an external device to generate LTC timecode from the MIDI TIME CODE from *PROTOOLS*™. However, we would recommend caution, and to treat this method as experimental only.



The computer running *PROTOOLS*™ will need midi configuring to and from 2TOOLS™. If you are using Apple **OSX**, see **section 4.3** for 'AUDIO MIDI SETUP' , or for Apple **OS9**, you may need the 'OMS' **section 4.2**.

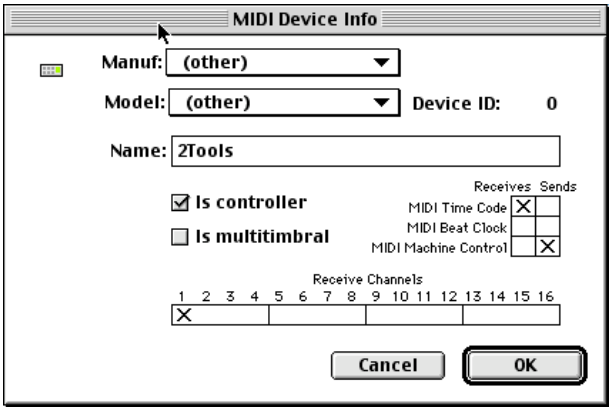
Section 4.4 of this manual describes setting up 2Tools v2.2U software with *PROTOOLS*™ v7.3.1 using the 'HUI' midi controller protocol. Earlier versions of *PROTOOLS*™ while not described here, may also be able to run in this way, with appropriate adjustments. However, prior versions of 2Tools have used the 'CS10' protocol, and require the relevant manual to set up. *(see Appendix A 'Updating Software' and B:'Check What Software Is Running'*)

For normal operation, select the main *PROTOOLS*™ setting on the rotary switch on 2TOOLS™, and leave set.

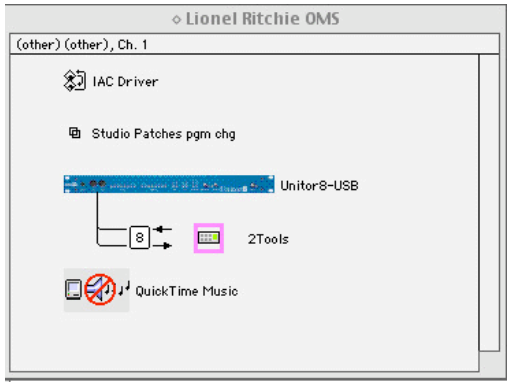
4.2 Apple OS9 - OMS Studio Setup

If you are using OS9 and OMS for Midi; create a new MIDI device to add 2TOOLS™ to your 'Studio setup':

Example Setup - OMS Studio Setup - new device...

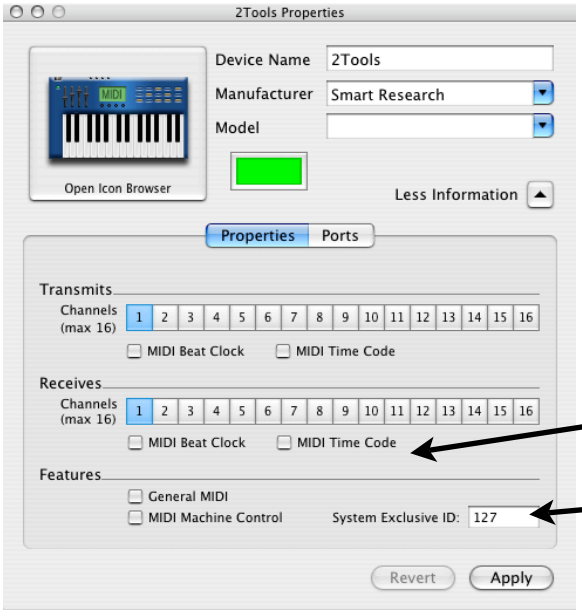


OMS Midi Setup - enable your port...



4.3 Apple OSX - AUDIO MIDI SETUP

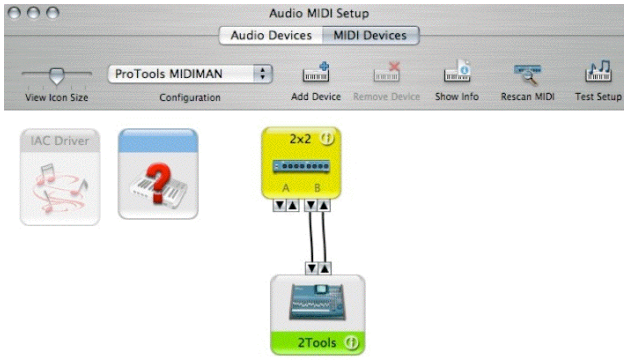
For OSX users, open 'AUDIO MIDI SETUP'.Then, create a new device for 2TOOLS™:



Setup midi properties like this:

'Receives: MIDI Time code' is not usually necessary, but can be selected as a precaution.

ID should be set.



And connect 2Tools to your midi interface to enable. This example uses a Midiman 2x2 interface (a recommended test unit).

4.4 ProTools HD (v7.3.1)

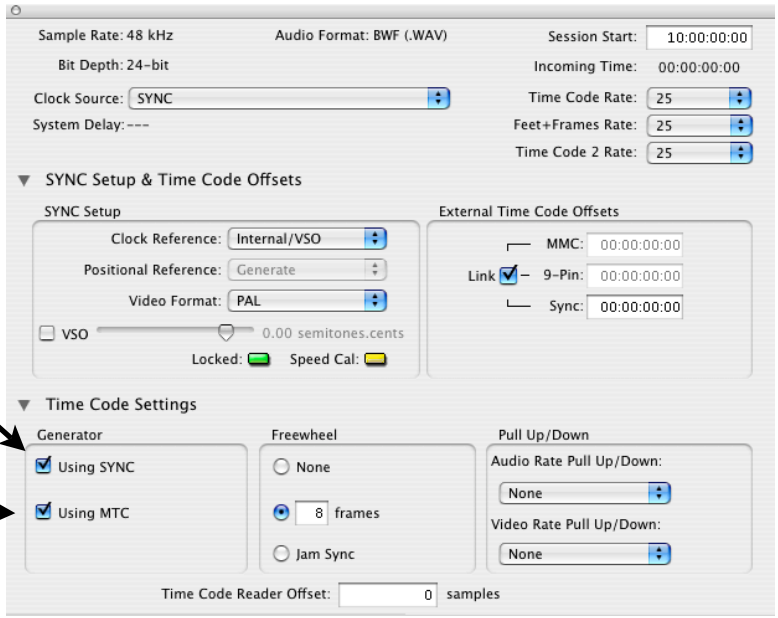
SETUP MENU PAGES:

> SESSION:

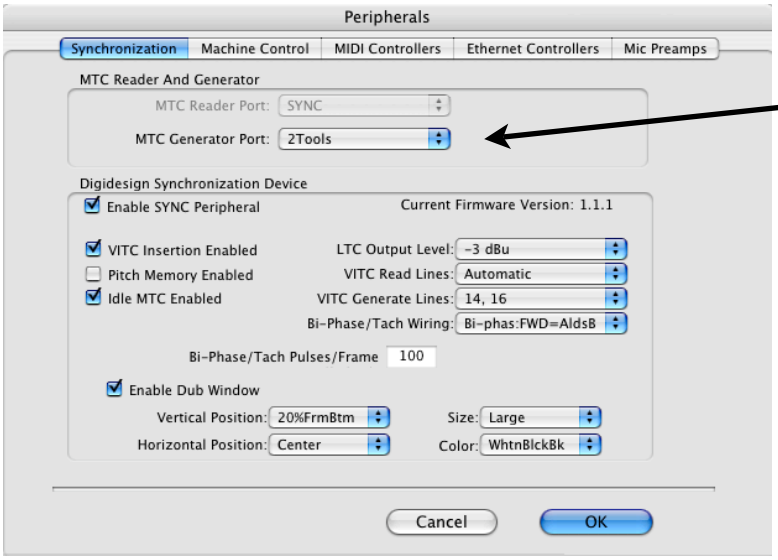
The Session Window sets Time Code options. 'Timecode Rate' should agree with your Console's settings.

Enable LTC Timecode from the SYNC unit for your Console.

Enable MTC from your MIDI output port to the 2Tools input. (When PRO-TOOLS™ is in play, the 2Tools MTC LED should light).



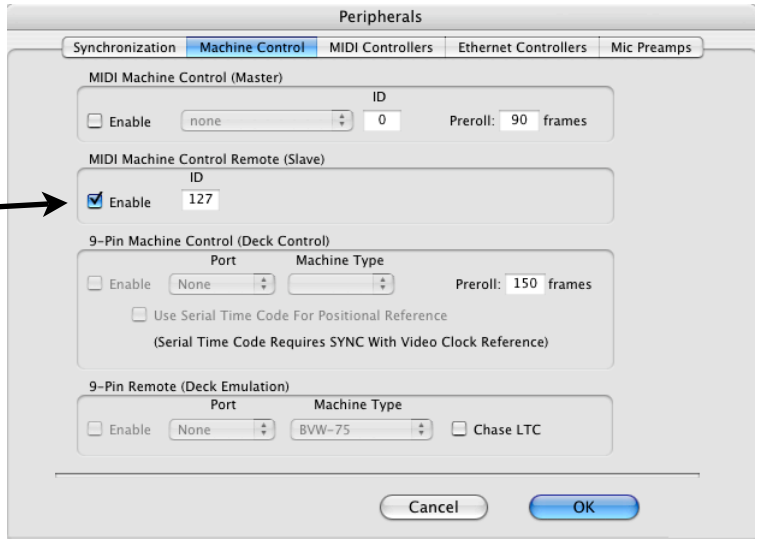
> PERIPHERALS >SYNC.:



This should ensure MTC is fed to 2Tools.

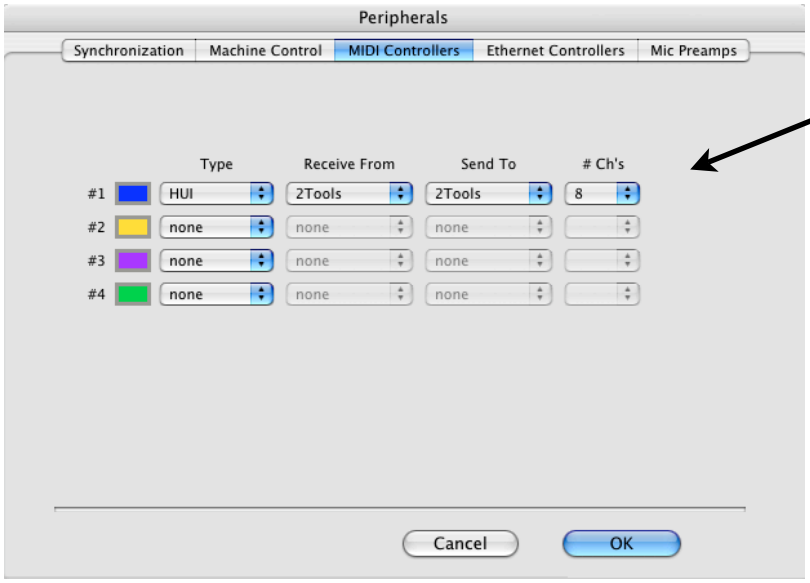
> PERIPHERALS >MACHINE C.:

Sets target id for midi controller messages (but MMC messages are not used for 2Tools)…



SETUP MENU PAGES (continued):

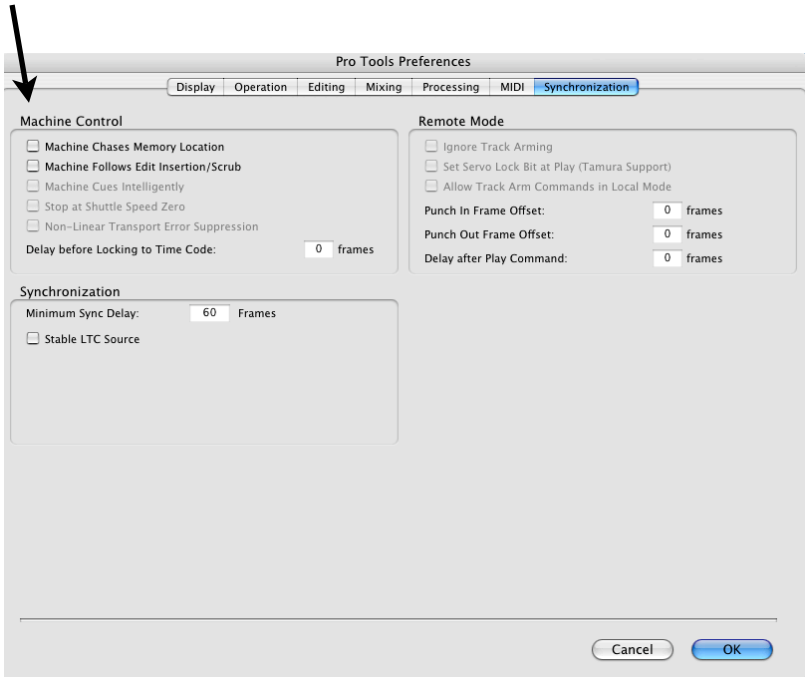
> PERIPHERALS >MIDI CONTROLLERS:



Enable HUI protocol for 2TOOLS™. (also tested running as controller 4 concurrently with an existing SSL AWS900)

> PREFERENCES >SYNCHRONISATION:

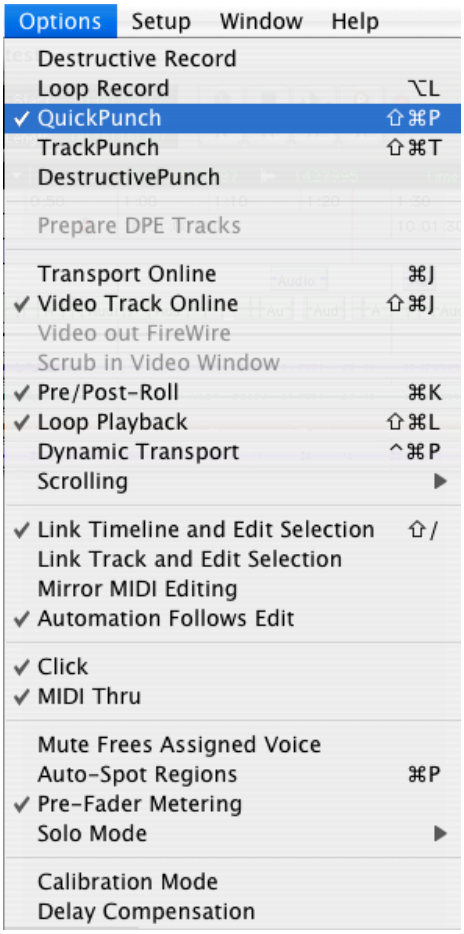
None of the preference pages should contain settings relevant to 2Tools, except that 'Machine Control' options should not be selected.



OPTIONS MENU:

RECORD MODE
The QuickPunch mode needs to be set to allow record (from the 2TOOLS™ parallel remote transport keys) to work properly.

WARNING:
If "Loop Playback" is used the Automation computer may have problems locating *PROTOOLS*™



TRANSPORT:

The sync button needs to be enabled for the SYNC box to produce Timecode:

Make sure *PROTOOLS*™ is online, in order to produce audio timecode for the SSL mix computer.

That should be everything needed for success with v7.3.1.....

APPENDIX A

Updating Software

For SSL and *PROTOOLS*™, 1.4U software is compatible with all *PROTOOLS*™ versions to date, and uses the CS10 midi protocol. This requires the additional 'Legacy Midi Controller' support file installed in *PROTOOLS*™. Version 2.2U now uses the more standard 'HUI' midi controller protocol. There's no need to update if you are running OK with 1.4U, but its recommended for new installations or if upgrading *PROTOOLS*™ in future.

2TOOLS™ is shipped with permanent software installed in ROM. Also, all units from version 1.4 onward have the capacity to download updates as a midi file, which then supercede the ROM on power up, and run permanently in battery backed RAM until replaced or removed. This section describes:

- how to remove software running in RAM, and revert to your original ROM software.
- how to update 2TOOLS™ with new software in RAM using a MIDI System Exclusive file.

REQUIREMENTS TO DOWNLOAD NEW SOFTWARE

HARDWARE....
You will need at least version v1.4T running in ROM. If you have an earlier version, (some serial numbers before 2T0038) we can supply a ROM for you to install, together with instructions.

You also need a MIDI interface capable of sending System Exclusive data. Most users will already have one for their audio systems. Connect the Mac (or PC) MIDI OUT to 2TOOLS™ MIDI IN.

SOFTWARE....
You will need a Mac (or PC) utility program capable of sending System Exclusive data files via your MIDI interface. If you do not have one, we recommend the Sysex Librarian program at www.snoize.com. If you already have a program capable of MIDI System Exclusive Dumps please use it.

FIRST: REMOVE OLD SOFTWARE IN RAM

METHOD ONE....
If the S29E cable is plugged in, set 2TOOLS™ to the 'TEST' position. Then, turn it off and on again while holding down the RW; FF, and STOP switches on your console. It will re-boot and display a sign-on message corresponding to the version of software now running.
see 'CHECK WHAT SOFTWARE IS RUNNING'.

METHOD TWO....
Load the MIDI file named 'purge.syx' into 2TOOLS™, which will empty the RAM . It is always supplied bundled with any new software, and is a very small file which loads almost instantly. 2TOOLS™ will then re-boot and display a sign-on message corresponding to the version of software now running.

LOADING NEW SOFTWARE INTO RAM

First, make sure that no other MIDI signals such as MTC are reaching 2TOOLS™. Then set 2TOOLS™ to the *PROTOOLS*™ Tools setting.

USING THE SYSEX LIBRARIAN PROGRAM....
Open the downloaded file (from smartresearch.co.uk) i.e. 2T21A.syx. Highlight the file, and click on the Play button to send.

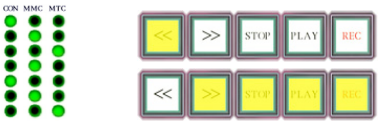
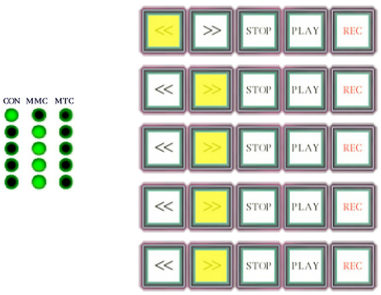
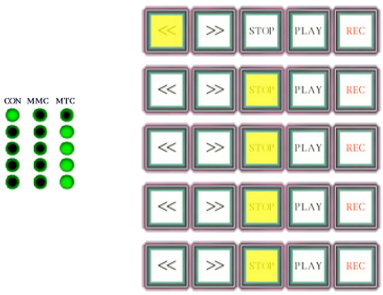
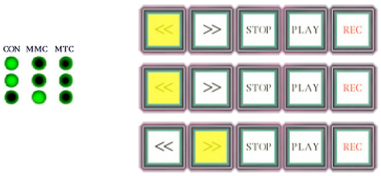
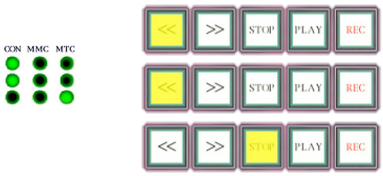
DID IT GET THERE? ....
The download is takes around 13 seconds. 2TOOLS™ checks the incoming software for errors and does not run it unless it is fully verified. If the download was successful, your 2TOOLS™ will then reboot and display a sign-on message corresponding to the version of software now running. see 'CHECK WHAT SOFTWARE IS RUNNING'.

APPENDIX B

Check What Software Is Running

On power up (and in the Test position from **v1.4U** onwards), 2TOOLS™ will flash its front panel LEDs and the console transport lamps to indicate what software is running, and whether running in ROM (original) or battery backed RAM (which can be changed), as shown in the following table.

Note: all versions after **v1.4T** conform to the message format shown for **v1.4U** and **v2.1**; i.e: first SSL/RW flash for the first digit of the software number, then MMC/FF flash for the second digit if in ROM, or, MTC/STOP if in RAM .

SOFTWARE VERSION	RUNNING IN ROM		RUNNING IN RAM	
	LED'S	LAMP'S	LED'S	LAMP'S
v1.0				
v1.4T				
v1.4U				
FUTURE VERS… E.G V2.1				

From **v1.4U** onwards the version sequence is also shown and repeated in TEST mode, and alternates with the test LED and LAMP sequence.

APPENDIX C

Connector Pinouts and Cables

MIDI OUT 5 way DIN Socket
01 ***nc***
02 GND
03 ***nc***
04 Tx+
05 Tx-

MIDI IN 5 way DIN Socket
01 ***nc***
02 ***nc***
03 ***nc***
04 Rx+
05 Rx-

RS422 Connector 9 way D FEMALE
01 GND
02 Rx-
03 Tx+
04 GND
05 ***nc***
06 GND
07 Rx+
08 Tx-
09 GND

S29E Connector 25 way D FEMALE
01 ***nc***
02 LAMP common +18 to 20V
03 RWD Switch
04 FWD Switch
05 STOP Switch
06 PLAY Switch
07 ***nc***
08 RECORD Switch
09 TACH
10 DIRECTION
11 ***nc***
12 ***nc***
13 ***nc***
14 ***nc***
15 SWITCH common
16 RWD Lamp
17 FWD Lamp
18 STOP Lamp
19 PLAY Lamp
20 ***nc***
21 RECORD Lamp
22 TACH Common
23 DIRECTION Common
24 ***nc***
25 ***nc***

CABLES PROVIDED:

SSL S29E Console Remote Cable: Male-Female 25way D connectors, all pins connected one to one.
IEC Mains cable.

APPENDIX D

Specifications, Notices, and Such

Specifications:

INS & OUTS:

2 x 5 way MIDI DIN Sockets
9 way D Female.
25 way S29E D Female. (operation designed for 24v Transport Lamps).
IEC mains inlet (incorporating drawer for fuse and spare).

.

MECHANICAL:

A quite little biddy, bitty box, 230 x 105 x 62 mm. Approx 1KG.

POWER:

Auto ranging AC voltage input: 100v - 240v, 15 watts.
Fit only 250v 630mA type T, slow blow fuse.

~CAUTION~

High voltages are present on the circuit boards inside the case. Remove power to the unit before opening.

(1) Unauthorised transfer or duplication of all or any part of this Manual is very easy using modern technology but we would rather you don't, please.

(2) SMART RESEARCH LTD. accepts no liability whatsoever for any loss or injury incurred by the owner or by any third party while using the device or any other device anywhere and at any time, ever.

(3) Every effort has been made to ensure that this product is flawless. If any defect is found that is due to a fault on the part of the manufacturer or global warming, the product will be replaced free of charge, at the discretion of SMART RESEARCH LTD. No responsibility is accepted for defects not caused by the manufacturer.

(4) The contents of the software and Manual are subject to change without anyone knowing.

(5) Every effort has been made to ensure that no engineers where harmed during the making and testing of this product but moral accidents will happen despite all our best efforts.