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STUDER A810 TAPE RECORDER FOR
PILOT AND SMPTE/EBU TIME CODE
FORMATS

Product Information

STUDER A810 tape recorder for PILOT and SMPTE/EBU TIME CODE formats



AUDIO SYSTEMS FOR PILOT-TONE AND TIME CODE SYNCHRONIZATION

Replacement of the old pilot-tone system by the standardized SMPTE/EBU 80 Bit time-code is progressing rapidly. However, to ensure that differently encoded tapes can still be worked with, STUDER has created several special variants of the STUDER A810 tape recorder. With these recorders synchronized operation is possible with the following formats:

1. Tape Formats

1.1. Audiotracks

The formats listed below are all with reference to 2-track 1/4" recordings with 2 mm track separation. The only exception being Neopilottone recordings which are used with full track only.

1.2. Sync-Track/Code Format

- Neopilot-tone Frequency: 50 or 60 Hz
 Track configuration: 2 tracks, each 0,45 mm

- FM-Pilot-tone Frequency: 50 or 60 Hz
 Carrier Frequency: 13,5 kHz (17 kHz)
 Track Width: 1 track 0,38 mm

- Aaton Frequencies: 50 or 60 Hz Pilot tone
 500 Hz ... 6 kHz superimposed code
 Form of Modulation: FM or AM modulated (selectable)
 Track Width: 1 track 0,38 mm

- Time Code Format: SMPTE/EBU (80 bit code)
 Form of Modulation: Bi-phase marked
 Track Width: 1 track 0,38 mm

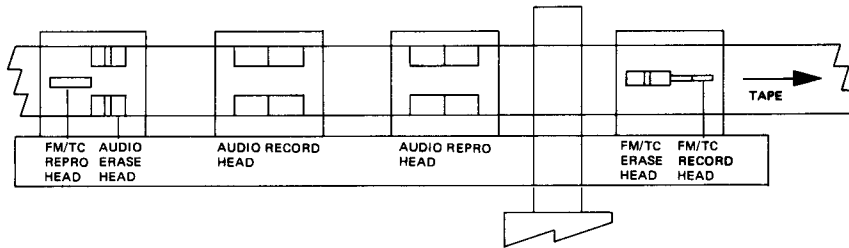
2. Possible Form of Utilization of the various A810 Recorders

Model Designation	To record	To reproduce	Transfer to
A810-2 TC FM/NEO VUK HS 60.118.10436 (Track pos. fig. 1)	. FM Pilot-tone . Time code . Neopilot (optional)	. FM Pilot-tone . Time code . Neopilot (optional)	. FM-pilot to time-code* . - . -
A810-1 P VUK HS 60.118.10435 (Track pos. fig. 2)	. Neopilot	. Neopilot	. -
A810-2 TC FM/AATON (NEO) VUK HS 60.118.10438 (Track pos. fig. 1)	. FM-pilot-tone . Time code on FM-carrier . Time code . Aaton . Neopilot (optional)	. FM-pilot-tone . Time code on FM-carrier . Time code . Aaton . Neopilot (optional)	. FM-pilot to Time code* . - . - . - . -

* In combination with a pilot-tone synchronized time code generator (refer to fig. 3).

3. Head Configurations

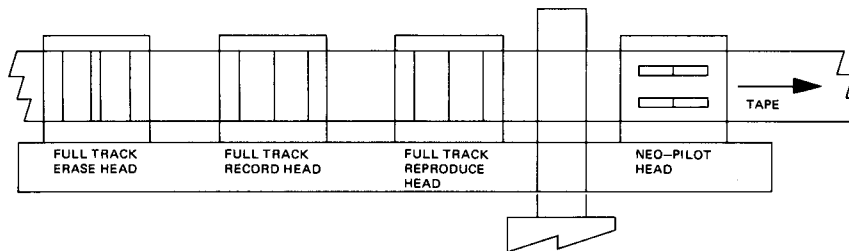
A810-2 TC FM/NEO VUK HS
 A810-2 TC FM/AATON (NEO) VUK HS



- Audio 2-track with 2 mm track separation,
- TC recording and replay
- FM-pilottone recording and replay,
- FM pilot-tone replay and TC recording

Fig. 1

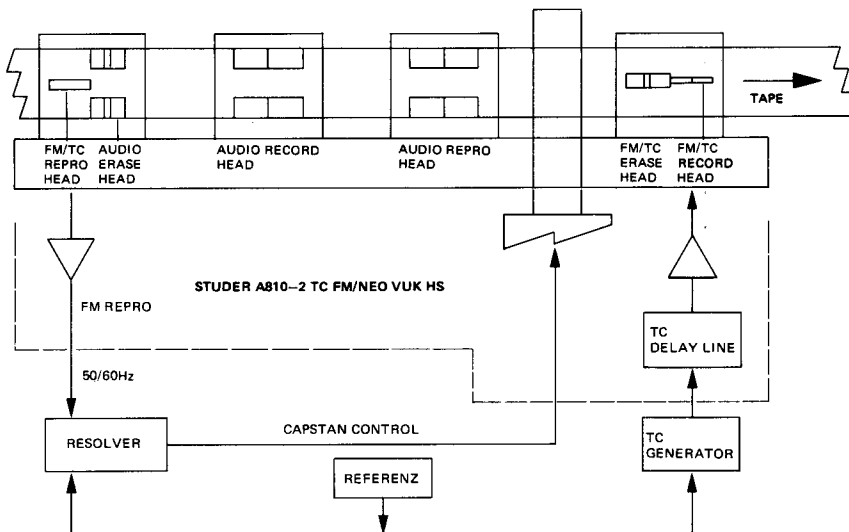
A820-1P VUK HS



- Audio full-track recording and replay,
- Neopilot-tone recording and replay

Fig. 2

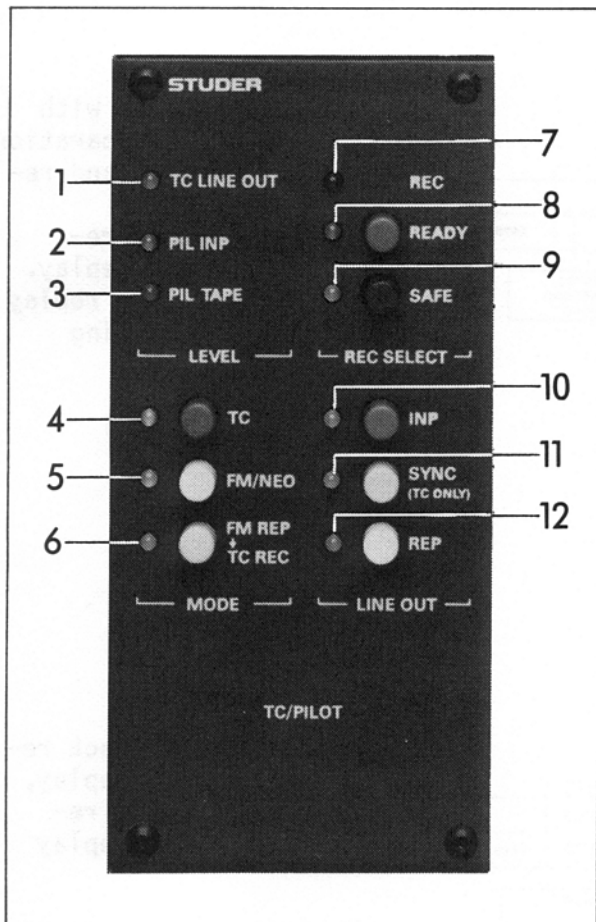
Possibility to transfer FM pilot-tone into time code



- Audio 2-track with 2 mm separation
- TC recording and replay
- FM-pilottone recording and replay
- FM pilot-tone replay and TC recording

Fig. 3

4. Control panel for mode of operation



1. Time code signal indication (threshold adjustable)
2. Pilot input signal indication (threshold set to 300 mV)
3. Pilot tape signal indication (output voltage = 1 Volt)
4. Machine recording and reproducing TIME CODE
5. Machine recording and reproducing FM- or NEO PILOT
6. Replacing previously recorded FM-Pilottone with TIME CODE
7. Record indication for TIME CODE or FM or NEO PILOT
8. READY indication for TIME CODE or FM or NEO PILOT
9. SAFE indication for TIME CODE or FM or NEO PILOT
10. PILOT or TIME CODE input signal on LINE OUTPUT
11. TIME CODE signal referring to record head on LINE OUTPUT
12. PILOT or TIME CODE signal referring to reproduce head on LINE OUTPUT

5. Description of different versions**A810-2 TC FM/NEO VUK HS**

60.118.10436

- 1/4" machine, 2-track/stereo with 2 mm track separation, center time code track and 2-track erase head
- FM pilot record/reproduce facility
- FM reproduce with simultaneous TC record facility (no resolver nor TC-Generator included)
- Neopilotone record/reproduce facility with optional full-track neopilotone headassembly - order no.
- Separate panel equipped with:
 - VU-Meter units with channel mode-selectors
 - Mode-Selector for TC, neopilot and FM channel
 - Monitor loudspeaker
- In- and outputs equipped with transformers
- Max. reel diameter 11.1" (282 mm)
- Tape speeds 3,75/7,5/15/30 ips

20.020.301.52

A810-1 P VUK HS

60.118.10435

- 1/4" machine, mono with full-track erase head
- Separate panel equipped with:
 - VU-meter unit with channel mode-selector
 - Monitor loudspeaker
 - Separate channel control for Neo-Pilotone channel
- In- and outputs equipped with transformers
- Max. reel diameter 11.1" (282 mm)
- Tape speeds 3,75 / 7,5 / 15 / 30 ips

A810-2 TC FM/AATON (NEO) VUK HS

60.118.10438

- 1/4" machine, 2-track / stereo with 2 mm Track separation, center time code track and 2-track erase head
- FM pilot record/reproduce facility
- FM reproduce with simultaneous TC record facility (no resolver nor TC-Generator included)
- Aaton (AM or FM modulated) record/reproduce facility
- FM modulated TC record/reproduce facility
- Neopilotone record/reproduce facility with optional full-track neopilotone headassembly order no:
- Separated panel equipped with:
 - VU-meter units with channel mode-selectors
 - Mode-selector for TC, neopilot and FM channel
 - Monitor loudspeaker
- In- and outputs equipped with transformers
- Max. reel diameter 11.1" (282 mm)
- Tape speeds 3,75 / 7,5 / 15 / 30 ips

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6. Synchronization

By utilizing the TLS 4000 system, different code formats can be accommodated for synchronization. The following combinations are possible.

6.1. Synchronization to repetitive signals (resolving)

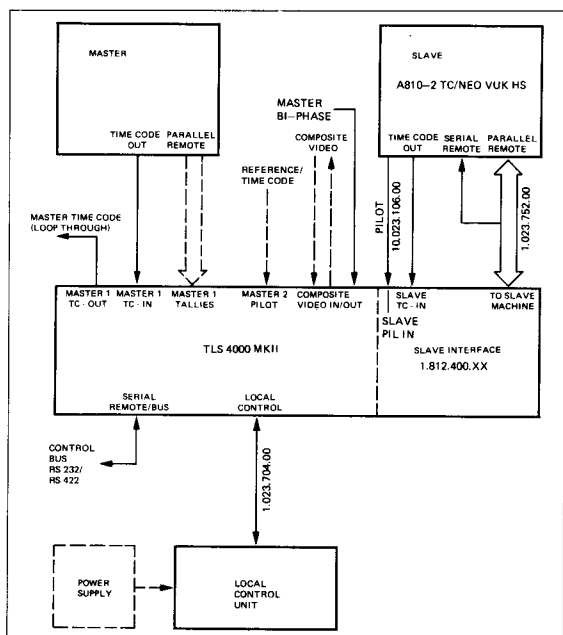
MASTER REFERENCE	A810 SLAVE REFERENCE		
	Neopilot	FM-Pilot	Time code
• Pilot 50/60 Hz (20 Hz - 20 kHz)	x	x	x
• Biphase	x	x	x
• Video composite	x	x	x

Note: Tape with an Aaton recording cannot be synchronized

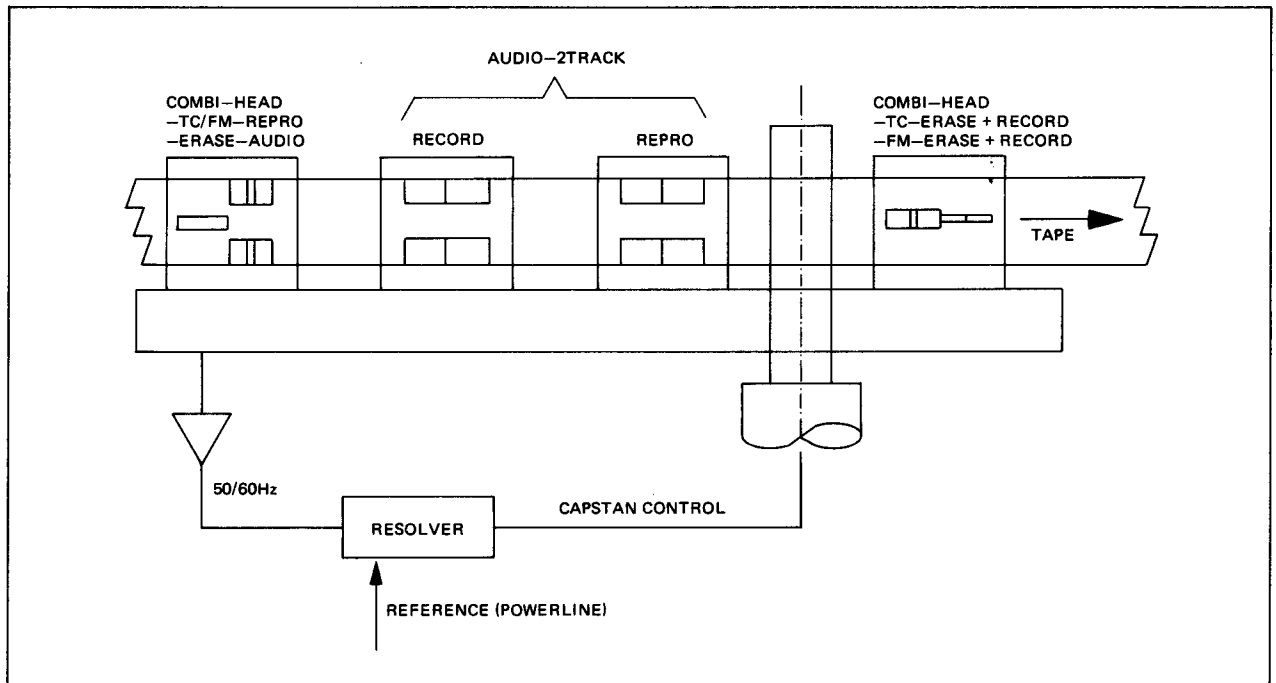
6.2. Synchronization with SMPTE/EBU time code

MASTER REFERENCE	A810 SLAVE REFERENCE
	Time code
Time code	x
Biphase	x

6.3. System Configuration



6.4. Headblock configuration and servo



6.5. System components

A810-2 TC FM/NEO VUK	60.118.10436
Serial Interface RS 232	20.810.881.00
VU-meter panel and LCU overbridge	1.038.888.00
Console	1.038.880.00
Pedestal Rack 19"/3 U	1.038.890.00
Filler Panel 2 U	1.918.002.00
TLS 4000 MK II Synchronizer	69.088.12301
Local Control Unit	69.088.12351
Interface A810 MK II	1.812.400.20
Cable	1.023.704.00
Interface Cable	1.023.752.00
Cable A810 Pilot output -> TLS pilot in (XLR 3 / XLR 5) 1,5 m	10.023.106.00
Cable A810 TC out -> TLS TC in (XLR 3 / XLR 3) 1 m	1.925.000.00

7. Local Control Unit (LCU)

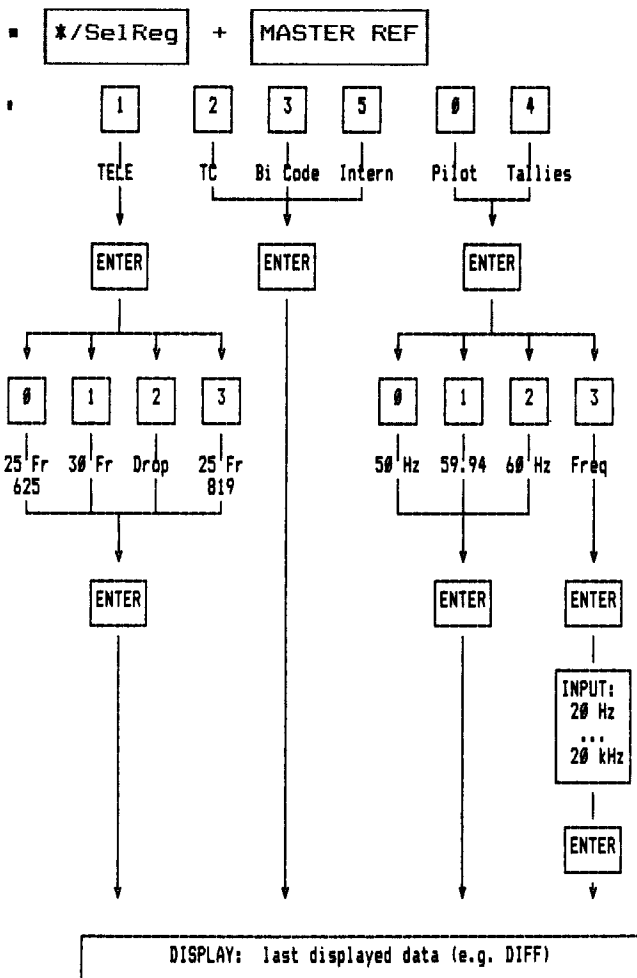
All desired synchronizing modes can be selected on the LCU.

7.1. Synchronization with pilot-tone (resolver mode)

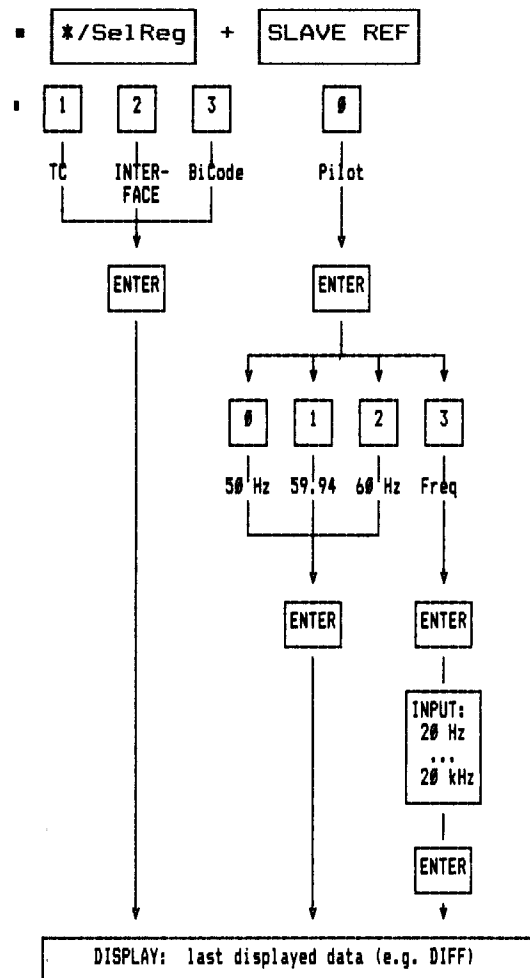
8/9. MASTER REFERENCE / SLAVE REFERENCE
For entry of reference refer to fig. 4/5.

7. RESOLVE

If the slave is running in play, then it synchronizes to the MASTER REF.

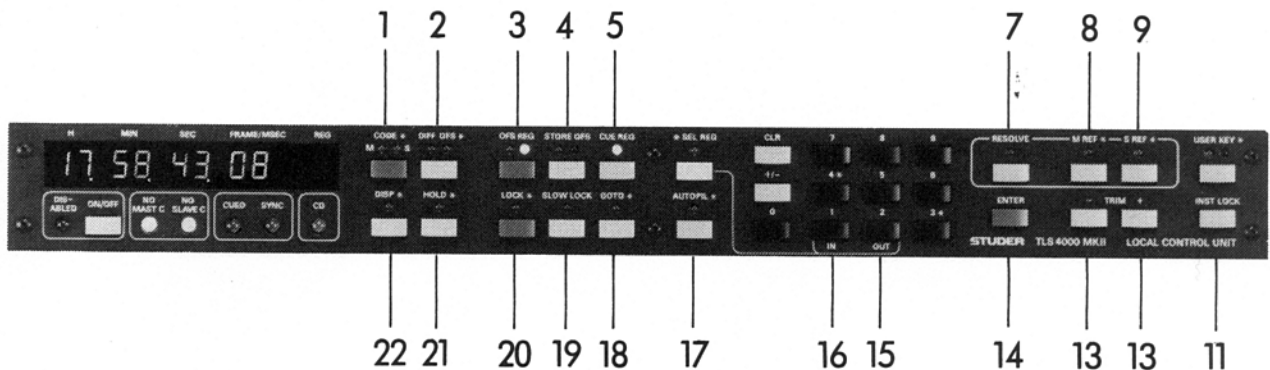


MASTER REF
Programming possibilities
Fig. 4



SLAVE REF
Programming possibilities
Fig. 5

7.2. Synchronization with time code or pilot tone



- 1. CODE: Change-over between MASTER and SLAVE address
- 2. DIFF: Display of DIFFERENCE between Master and Slave address
- 2. OFS: Display of actual OFFSET
- 3. OFS REG: Display of OFFSET value in the register
- 4. STORE OFS: Jumps in time code from the Slave tape will be ignored
- 5. CUE REG: Display of CUE value in the register
- 7. RESOLVE: Activates the resolver mode
- 8. MREF: Selection of the Master reference for resolve mode
- 9. SREF: Selection of the Slave reference for resolve mode
- 11. INSTANT LOCK: Takes over the momentarily existing offset
- 13. TRIM: Permits +/- offset entries in FRAMES/MS/SUBFRAMES
- 14. ENTER: Shifts entered value into memory
- 15. SLOW LOCK: Slow speed adaptation of the capstan motor without any audible pitch variation
- 15./16. IN/OUT: Display of values in enter or exit registers respectively
- 17. AUTO PILOT: Run up with time code. Once synchronism is reached, automatic change-over to the PILOT-TONE FREQUENCY
- 18. GOTO: Instructs the Slave to locate at the address stored in the CUE-REG
- 18./20. GOTO + LOCK: Slave locates address and synchronizes to Master, as soon as Master passes the GOTO address
- 19. SLOW LOCK: Slow speed adaptation of the capstan motor without any audible pitch variation
- 20. LOCK: Initiates CHASE LOCK sequence
- 21. HOLD: Enters figure in display into memory
- 22. DISP: Display of time code/entry in FRAMES/MS/SUBFRAMES