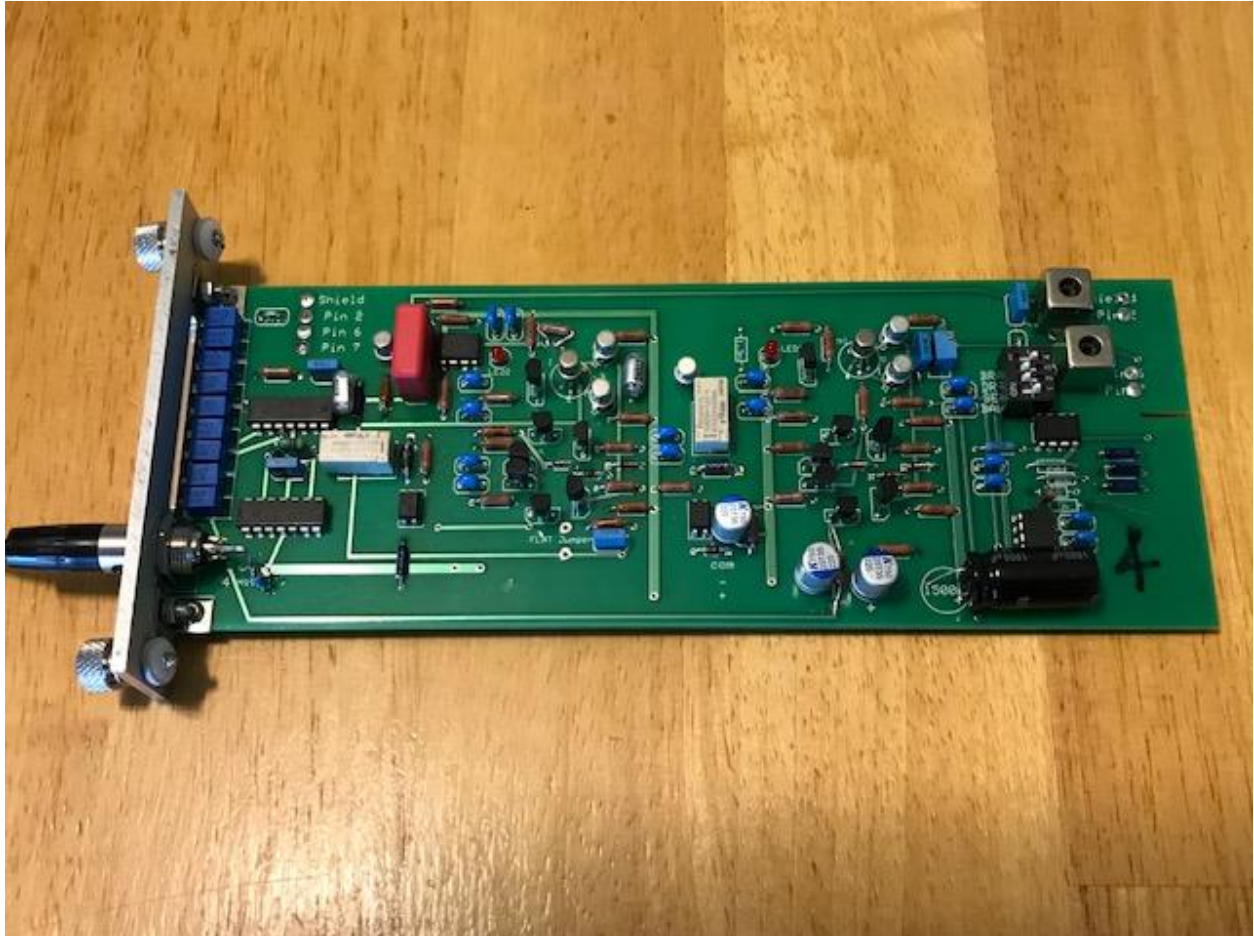


NextGen Studer A80R/C Record Card - Key Features & Characteristics:

Finally: a "Plug & Play" Studer A80R/C Record Card that transforms the legendary Studer A80 Master Recorder into the world's finest Magnetic Tape Music Recorder/Reproducer.

Paired with our outstanding NextGen A80R/C Repro Card, a truly radical re-think of Magnetic Tape Recording that re-defines what was thought possible from Magnetic Tape.



I. Key Design Elements & Features:

- All direct-coupled, discrete transistor class A circuitry from Front Panel single-ended and unbuffered purist RCA Record Input to Record Head for the purest possible sound;
- Precision balanced transformerless (TI INA137) record input, utilizing the stock Studer XLR connector:
 - Supports all A80R/C legacy VU Meter Bridge, Input- or Repro- selection, Record and Playback volume controls, using existing A80 XLR connectors;
- No capacitors anywhere in the signal path except for a single high quality precision polypropylene film capacitor (Dielectric Absorption <0.05%) to set Group Delay compensation for true Linear Phase, two similar precision polypropylene capacitors to set Record Head-/Wavelength- Model corrections at Low Speed and High Speed, another similar polypropylene capacitor for treble adjustments, and finally a single similar polypropylene capacitor used in the precision DC servo; time-smear effects are all but eliminated;
- Highly effective Group Delay compensation when Recording realizes near-ideal time domain playback response when used with the NextGen A80R/C Repro Cards, and audibly improved time domain response when played back on other High-Quality semi-professional and professional decks;
- Advanced Two-Stage B-H linearizer provides unequaled low-distortion dynamic range and maximum SNR when used with the NextGen A80R/C Repro Cards, and audibly improved clarity, detail, and dynamic range when played back on other High-Quality semi-professional and professional decks;
- Available in 15/30 ips and 7.5/15 ips models: supporting a single EQ per speed:
 - 15/30 ips NextGen A80 Record Card:
 - 15 ips: NAB or CCIR,
 - 30 ips: AES
 - 7.5/15 ips NextGen Repro Card:
 - 7.5 ips: NAB,
 - 15 ips: NAB or CCIR

- Tight component tolerances and Pre-Set record adjustments available for several commonly used magnetic tapes, EQs, and tape speeds, largely eliminating the need for precision test equipment to realize excellent results. Currently supported:
 - Maxell UDXL: 7.5 ips NAB, 15ips NAB or CCIR
 - SM911: 15 ips NAB or CCIR, 30 ips AES
 - SM900: 15ips NAB or CCIR, 30 ips AES
 - PEM468: 15ips NAB or CCIR, 30ips AES
 - ATR Master Tape: 15ips NAB or CCIR, 30 ips AES

(Contact us if you have special Tape/Speed/EQ requirements)
Please review the following section on setup and adjustments.

II. **Specifications**¹:

- Exceptionally low-distortion, extended dynamic range and SNR thanks to advanced 2-stage B-H linearizer and all-discrete Class A electronics:
 - Approximately 1/3 to 1/5 the THD (Total Harmonic Distortion) at the Manufacturer/s specified fluxivity (record level) for 3% 3rd Harmonic only distortion at 1 KHz, depending on tape;
 - Exceptional SNR approaching or exceeding 79 dB A-wtd at 15 ips CCIR, 1/4" tape, depending on tape (even Maxell UDXL!) , and generally at least 1-2 dB better or more than manufacturer's specification.
- Essentially free from dielectric absorption (time-smear/capacitor memory) effects by all DC-coupled electronics (including directly to the Record Head), and low dielectric absorption Polypropylene film capacitors
- Superior, linear phase time domain response thanks to Group Delay Equalizer
- Accurate Record/Replay equalization conformance, and extended frequency response: optimized for the Studer-supplied A80 Butterfly or 1/2 track heads; when set at recommended output operating levels relative to tape fluxivity² and measured at least 10 dB below operating level:
 - 30 ips AES: typically achieves equal or better than $\pm 0.75\text{dB}$ 125Hz - 20 KHz, and less than 1.5 dB error at 32 Hz and 63 Hz, using NextGen A80R/C Repro cards as supplied to user

¹ All in-deck specifications based on properly-operating/well-regulating Audio Stabilizer Card, Oscillator Card and NextGen A80R/C Repro Card.

² See following "Recommended Settings"

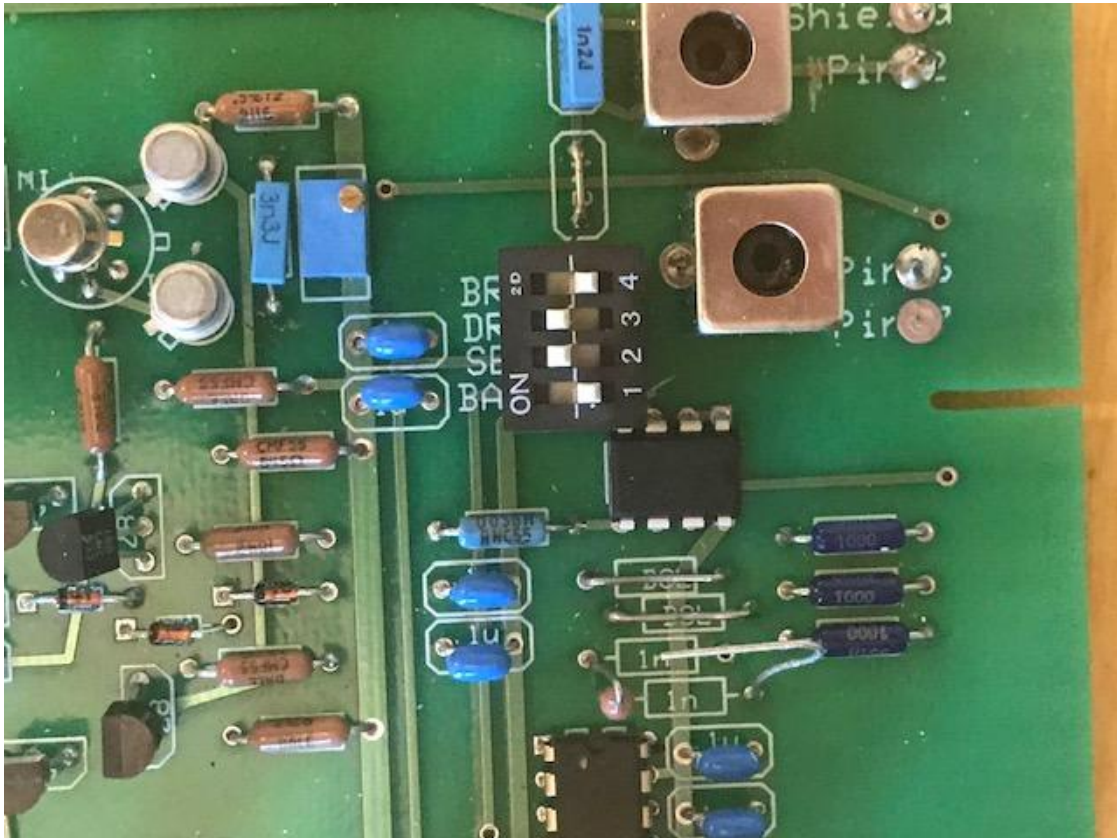
- 15 ips NAB, CCIR : typically achieve equal or better than ± 1 dB 200Hz - 18 KHz at 15ips, and less than 1.5 dB error at 32-125 Hz, using NextGen A80R/C Repro cards as supplied to user
 - 7.5 ips NAB: typically achieves equal or better than ± 1.5 dB 50Hz - 16Khz, using NextGen A80R/C Repro cards as supplied to user
- Front-panel Purist single-ended RCA record input (from 4-pin mini-XLR breakout cable) for highest possible performance in short single-ended cabling conditions where hum and noise pickup is not a problem; standard Studer XLR connected balanced input is transformerless for best possible performance with balanced inputs.
 - Input Levels: Nominal NextGen A80R/C Record Card input levels for 350nWb/m fluxivity are preset as follows:
 - Single-ended Front Panel: 0.23v rms (non-buffered or attenuated); Recommended source impedance is 100 ohms or less.
 - Balanced XLR transformerless: 2 x 0.23v rms = 0.46v rms (buffered and attenuated 2:1). 1800 ohm balanced termination.

NOTE: if these levels are too sensitive then either select the **BR ("BRIDGE")** configuration (see below) and use the Record Volume controls, OR REDUCE SIGNAL LEVEL INPUTS EXTERNALLY TO THE RECORD CARD (i.e. TURN DOWN YOUR SOURCE VOLUME) RATHER THAN by ADJUSTING HS or LS GAINS. BECAUSE of the Relationship between levels in the 2-stage B-H linearizer it is recommended NOT to adjust the HS and/or LS GAINS from as received if you do not have access to suitable frequency response, SNR, and distortion measuring equipment!

- III. **We strongly urge you to try the preset NextGen A80R/C Record Card settings as received (turning down your source volume as necessary) prior to making any adjustments in settings.** Refer to V [Recommended/Nominal Settings](#) below.

IV. Configuration

A 4-position DIP switch is used to select INPUT CONFIGURATION (Front Panel Single-Ended/RCA, or Balanced Transformerless Studer XLR record input), and Bridge or Direct (Bridge Bypass) input.



Shown in DIRECT (DR) (i.e. Bridge Bypass) Single Ended (SE) configuration.

SE: selects the Front Panel Single-ended input;

BA: selects the Balanced input from Studer XLR input connector

NOTE: Select ONLY ONE of the above two source options by switching "ON".

BR ("BRIDGE"): the selected record input (**SE** or **BA**) is sent through the Bridge cabling, volume controls, and switches, preserving all stock STUDER Bridge functionality; In particular, the Bridge RECORD volume control functions as usual to adjust record level.

DR ("DIRECT"): sends the selected input to the Bridge (so that Input/Repro source switching and volume controls still function as far as VU meter indications and Deck outputs/monitoring are concerned), but sends the selected input DIRECTLY to the record electronics (bypassing all the Bridge cabling, switching, and Record Volume control as far as recording) for best possible sound, and is **strongly recommended**. Record Volume must be controlled externally.

V. Recommended/Nominal Settings

IMPORTANT NOTES:

1. NextGen does NOT recommend users attempt Record adjustments (beyond small adjustments -i.e. +/- 1 or 2 dB - in HS Gain and/or LS Gain ONLY) without appropriate test equipment including FFT- or real-time spectrum analyzer, distortion measuring equipment, low-distortion sinewave generator, and White Noise Generator, and operator knowledge as to how to use such equipment correctly.

NextGen is currently updating target settings for various tape types, using a larger data set for boards, tolerances, and tape batches, so please contact NextGen for guidance on various settings.

2. Please take NOTE of the settings information included with your Record Cards; These settings should be retained so that they can be restored - using a standard ohm meter if need be - at a later time or following adjustments that are not suitable. **See below for ohm meter measurement points.**
3. Because of its exceptional low-distortion dynamic range NextGen recommends setting operating fluxivity to at least 350nWb/m for maximum performance at 15 and 30 ips; if need be VU meter **indications** may be reset as desired so that 250nWb/m shall indicate 0 VU, etc.

The NextGen A80R/C Record card makes use of the following settings/adjustments:

(NOTE: HS refers to 30 ips on a 30ips/15ips record Card, and 15 ips on a 15ips/7.5ips Record Card.)

HS BIAS: sets the record bias for HS (30 ips or 15 ips depending on model); Please NOTE that an often used starting point for tape record settings - the Tape manufacturer's recommended 10Khz or 16 Khz overbias - may not be as useful as the saved settings delivered with your cards because of the behavior of the two-stage B-H linearizer, which depends significantly for its proper operation on the bias setting; the optimum Bias and linearizer settings can be obtained only with distortion measurement instrumentation.

In general, optimum Bias adjustment requires to set for **minimum THD at 1 Khz at 350nWb/m operating level (15 ips or 30 ips), and no more than 0.1% THD at 1 Khz a 250nW/m (7.5 ips).**

(This procedure is essentially the same as IEC Bias recommendations.)

IMPORTANT NOTE: It is recommended to RESET the B-H Linearizer trimpots to MINIMUM condition (~0 ohms) - i.e. linearizer OFF - by adjusting the trimpots FULL COUNTER-CLOCKWISE (CCW) prior to setting HS or LS Bias for THD (distortion) as above.

LS BIAS: sets the record bias for LS (15 ips or 7.5 ips depending on model)

HS and LS Bias MUST be properly set prior to the following adjustments.

TREBLE: adjusts high frequency response for flat response. Internal head- and wavelength-modeling for the HS and LS corrections and Group Delay compensation. In general adjustment is made on the most used/most critical speed, and then checked and/or slightly re-adjusted on the other speed for acceptable conformance. (requires test equipment) Usually, white noise at a level 10 dB or more below operating level is used as a source with suitable real-time or FFT analyzer and suitable averaging is used

HS Gain: Adjust HS gain. Generally used so that recorded level on the tape corresponds to the chosen reference fluxivity, i.e. 350nWb/m at 15 or 30 ips, and 250nWb/m at 7.5ips.

If the *VU meters* are set to indicate the reference fluxivity in both input and repro at 1 Khz, then the input and reproduce levels will indicate identical levels when switching between input (source) and off-the-tape (reproduce); this allows direct source/tape comparison at closely matched levels.

LS Gain: Same procedure as above for HS.

HS MOL: adjusts the B-H linearizer 2nd stage for lowest THD at "Maximum Operating Level" typically at +11 to +13 dB re 350nWb/m, depending on the Tape type (requires test equipment) and HS Gain setting. In general High-Bias tapes such as SM900 will use the higher figure, and "Standard-Bias" tapes will use the lower figure.

HS OL: adjusts the B-H linearizer 1st stage for lowest THD at "Operating Level", i.e. 350nWb/m + 5 to 7 dB, depending on the tape and HS Gain setting (requires test equipment). In general High-Bias tapes such as SM900 tapes will use the higher figure.

LS MOL: adjusts the B-H linearizer 2nd stage for lowest THD at "Maximum Operating Level" typically +11 to +13 dB re 350nWb/m (15ips) or 250nWb/m (7.5ips) depending on the Tape type (requires test equipment) and LS Gain setting. In general High-Bias tapes such as SM900 tapes will use the higher figure.

LS OL: adjusts the B-H linearizer 1st stage for lowest THD at "Operating Level", i.e. 350nWb/m (15ips) or 250nWb/m (7.5 ips) + 5-7 dB, depending on the tape and LS Gain setting (requires test equipment). In general, High-Bias tapes such as SM900 will use the higher figure, and "Standard-Bias" tapes will use the lower figure.

NOTE: The entire above procedure should be verified - and may need be repeated - making further small adjustments for best results because of certain unavoidable interactions between settings. IF NECESSARY, reset all trimpots to the initial settings of your board set.

Unless you are changing tape types from what was preset by NextGen, the results should be quite close to those included with your board set.

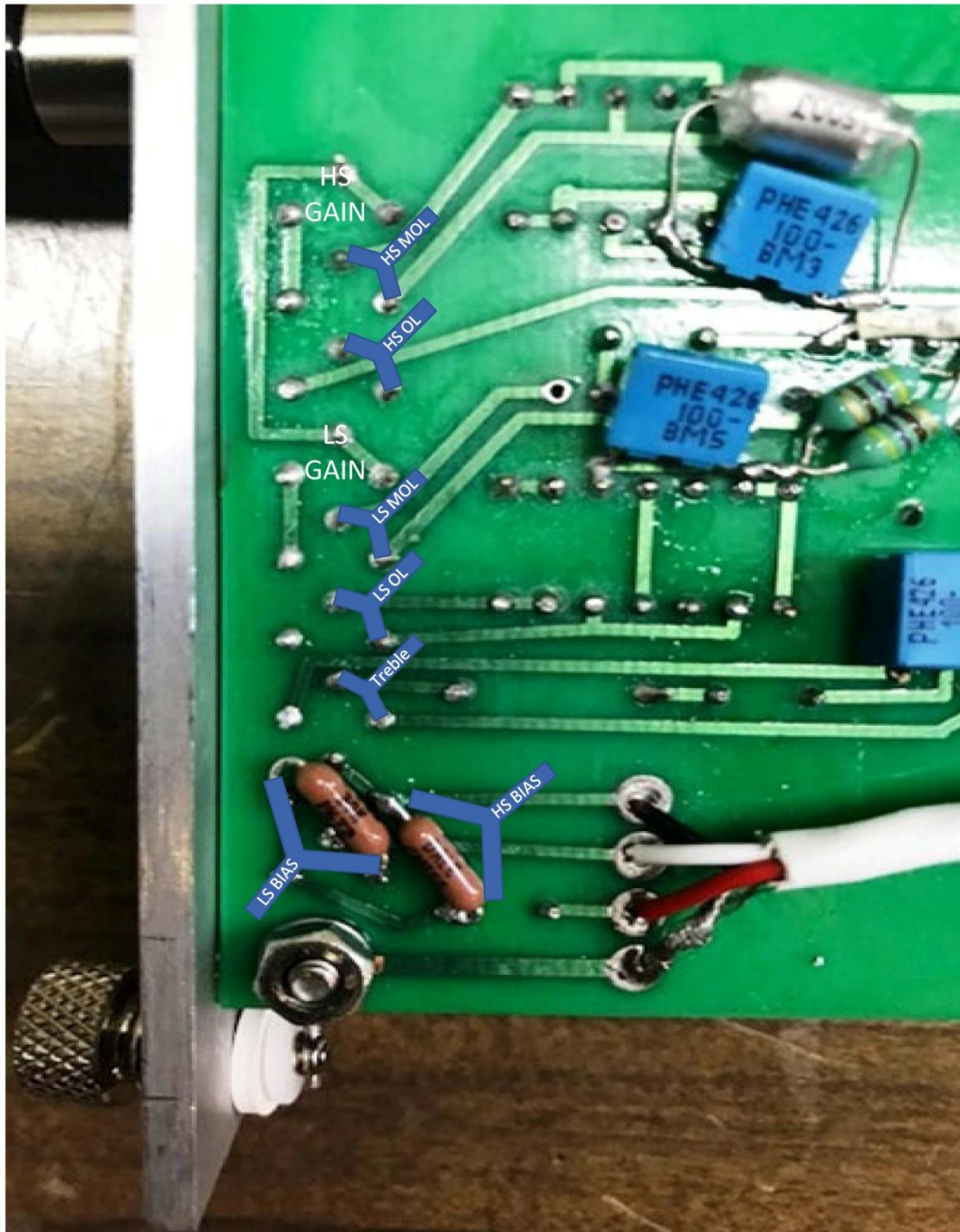
OTHER ADJUSTMENTS:

1. **Bias Traps:** The NextGen A80R/C record card Bias Trap have adjustable cores; these are preset at 150Khz - the nominal A80R/C oscillator frequency. The standard Studer A80R/C Bias Oscillators were not crystal locked, and can certainly vary by several percent (or more) with operating temperature and age. In most instances this will not be an issue, with more than 50 dB of Bias rejection in Record. If you have access to an A80R/C extender card you can tune your Bias Traps for maximum rejection of Bias (typically more than 56 dB bias rejection on the record card). **This will require a suitable CoilCraft SLOT-Ten ferrite core tuning tool or risk cracking the ferrite core (not covered under warranty);** contact NextGen for details and procedure if interested.

(NextGen is currently in development of a new low distortion, 250Khz crystal-locked A80R/C oscillator card which is expected to realize a further 2 dB reduction of tape bias noise (Improving SNR by the same amount), optimize bias amplitude- and frequency- stability, and trap operation.)

2. **VU Meter Indications:** Note that VU meter indications are *entirely separate* from actual tape operating levels (i.e. tape fluxivity), and can be set independently of record or repro gains. That is, adjusting VU meter sensitivity/gain can be used to reflect any given operating level, e.g. 0 VU at 180/200/250/350/500 nWb/m, or whatever indicated fluxivity is desired.

SETTING MEASUREMENT LOCATIONS, in OHMS



NextGen A80R/C Record Card: Back Side of Board

9-8-22: FINAL NEXTGEN A80R/C RECORD CARD TARGET SETTINGS:

SM900 TAPE (High Bias), HS=30ips AES, and LS=15 ips CCIR, 350nWb/m operating Level

<u>HS BIAS</u>	<u>6.42KΩ</u>	<u>(6-7KΩ)</u>
<u>LS BIAS</u>	<u>8.46KΩ</u>	<u>(8-9KΩ)</u>
<u>TREBLE</u>	<u>1600Ω</u>	<u>(1500 - 1700Ω) depends on Bias settings</u>
<u>HS MOL</u>	<u>900Ω</u>	
<u>HS OL</u>	<u>525Ω</u>	
<u>LS MOL</u>	<u>982Ω</u>	<u>(978-986Ω)</u>
<u>LS OL</u>	<u>405Ω</u>	
<u>HS GAIN</u>	<u>555Ω</u>	
<u>LS GAIN</u>	<u>754Ω</u>	<u>(750-758Ω)</u>

ATR MASTER TAPE (Normal Bias), HS=30ips AES, and LS=15 ips CCIR, 350nWb/m operating Level

<u>HS BIAS</u>	<u>10.32KΩ</u>	<u>(10-10.7KΩ)</u>
<u>LS BIAS</u>	<u>11.1KΩ</u>	<u>(10.9-11.2KΩ)</u>
<u>TREBLE</u>	<u>1600Ω</u>	<u>(1500 - 1700Ω) depends on Bias settings</u>
<u>HS MOL</u>	<u>996Ω</u>	
<u>HS OL</u>	<u>582Ω</u>	
<u>LS MOL</u>	<u>986Ω</u>	<u>(978-986Ω)</u>
<u>LS OL</u>	<u>588Ω</u>	
<u>HS GAIN</u>	<u>790Ω</u>	
<u>LS GAIN</u>	<u>985Ω</u>	<u>(750-758Ω)</u>

NOTE: these targets assume EITHER *exact* 150Khz Bias oscillator frequency (as the record cards are preset) OR correct adjustment of the Record Bias traps for the *actual* machine Bias

Frequency in situ (i.e. in the machine) using an extender card and suitable Bias Trap ferrite core tuning tool. Otherwise you can expect somewhat different settings of Bias, Treble, and Gains to result from added Bias leakage, and somewhat increased THD.

Card settings can also be expected to vary from the above targets for different Tape type and Tape speeds, EQs, Operating Level, head condition, and Repro Card calibration setup; please refer to the specific settings included with your Record (and Repro) cards for relevant information.

- Front Panel single-ended REC input is as follows: mating connector is : Switchcraft [TA4FLX](#);
 - Pin 4: Signal hot
 - Pin 1: Signal return
 - Shell: Chassis ground