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4.2.1.3 Equalizations

Equalization networks have been built into the reproduce paths for correcting the frequency response.

The attack points are referred to as transition frequencies and transition time constants ($1/2\pi f$) and have been standardized by various organizations (IEC, NAB, AES, CCIR).

TAPE SPEED	TRANSITION FREQUENCIES, LOW; HIGH (TRANSITION TIME CONSTANTS)		
	IEC-1968	NAB-1965	NAB-1975
3.75 ips 9.53 cm/s	50 Hz; 1800 Hz (3180 μ s; 90 μ s)	50 Hz; 1800 Hz (3180 μ s; 90 μ s)	- (-)
7.5 ips 19.05 cm/s	0 Hz; 2240 Hz (ω ; 70 μ s)	50 Hz; 3150 Hz (3180 μ s; 50 μ s)	0 Hz; 3150 Hz (ω ; 50 μ s)
15.0 ips 38.10 cm/s	0 Hz; 4500 Hz (ω ; 35 μ s)	50 Hz; 3150 Hz (3180 μ s; 50 μ s)	- (-)
30.0 ips 76.2 cm/s	0 Hz; 9000 Hz (ω ; 17.5 μ s)	AES-1971 0 Hz; 9000 Hz (ω ; 17.5 μ s)	- (-)

Equalization:

Select the required equalization on the master panel (CCIR or NAB).

If the same calibration data (level, frequency response, bias) are desired for both types of equalization, proceed as follows:

- Select preferred equalization (master panel).
- Adjust and check all audio parameters according to the instructions.
- Set code switch 7: JS 7 = 1.
- Read out and reload all previously entered parameters. The same parameters are now stored for both equalizations.

The equalization time constants can be changed selectively for special situations. In this case it is essential to set the code switch 7 to the off position (JS 7 = 0)!

4.2.2.4 Frequency response adjustment

Spool calibration tape forward to "TREBLE FREQUENCY RESPONSE" test section (16 kHz for 30 ips, 14 kHz for 15 ips, 12.5 kHz for 7.5 ips). The level of this section is approx. 20 dB (CCIR) below that of the reference level section. Connect millivoltmeter to line output channel 1.

Press CH1 and TREBLE REPRO on input keyboard.
Start recorder in play mode.
Adjust to optimum frequency response with UP or DOWN.
Press STORE.

On stereo recorders, connect the millivoltmeter to line output channel 2.
Press CH2 and TREBLE REPRO. Adjust to optimum frequency response with UP or DOWN.
Press STORE.

Rewind calibration tape to "FREQUENCY RESPONSE 63 Hz" test section. The level of this section is approx. 20 dB lower than that of the reference level section.
Connect millivoltmeter to line output channel 1.

Press CH1 and BASS REPRO on input keyboard.
Start recorder in play mode.
Adjust for optimum frequency response with UP or DOWN.
Press STORE.

On stereo recorders connect millivoltmeter to line output channel 2. Press CH2 and BASS REPRO. Adjust for optimum frequency response with UP or DOWN.
Press STORE.

Note:

Strong fringing effects can occur at low frequencies if mono calibration tapes are used for the reproduce adjustment of stereo recorders. To ensure that a linear reproduce frequency response is attained, the reproduce adjustment of the bass frequencies must either be repeated with the record adjustment or if no record adjustments are planned, a calibration tape with correct track separation should be used!

The reproduce frequency response can be adjusted for special situations by slightly varying the time constant of the reproduce equalization.

This is accomplished as follows:

- Set program switch 7 off: JS7 = 0.
- Press CH1 (CH2).
- Hold down TRANS <REDUCED> continuously.
- Press TREBLE REPRO and release both keys. TREBLE REPRO status indicator lamp flashes.
- The time constant can be increased by pressing UP, i.e. the transition frequency is shifted toward the lower frequencies.
- The time constant can be decreased by pressing DOWN, i.e. the transition frequency is shifted toward the higher frequencies.
- Press STORE.

Make sure DIL switch 7 of the Periphery Controller is set "0" (different audio parameters for NAB and CCIR Standard)!

If DIL switch 7 is on position 1, the same EQ parameter will be stored in parallel into the NAB and CCIR memory!

THEORETICAL EQUALIZATION ADJUSTMENTS		
TIME CONSTANT (μ S)	TRANSITION FREQ. ± 3 dB (kHz)	REPRODUCE HEX. VALUE
120	1.326	E5
90	1.768	A3
70	2.273	87
50	3.150	61
35	4.547	44
17.5	9.094	26