



SP 79 C Control Console

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With the high quality of today's recordings, tape-to-disk transfer has become an art which can determine the success or failure of an entire production. Every change of the recording level – prone to overload due to the frequency response – and every step affecting the frequency response, requires modification of the variable pitch control. Yet one companding system used for noise reduction (Dolby) requires a stable reference level. Because of the multitude of consecutive processing steps, each manipulation may easily lead to technical errors which can only be detected by experienced engineers.

The unique experience which The Georg Neumann Company has amassed in the disk-mastering field over the years has been invested in the design of the new SP 79 C control console. In it, all possible switching functions are logically linked in a way that ensures

optimization of all interdependent parameters, while the sound engineer can fully concentrate on the effects to be achieved. He only has to monitor the record level on the vu or the peak program meters.

As a further convenience, the control console features metering of every internal signal flow parameter and those fed to the SAL cutter drive logic maintaining with constant reference to the actual cutting level. Readings no longer have to be converted, eliminating a potential error source. Thanks to the remote-control facilities for the VMS disk cutting lathe system and the SAL cutter drive logic, the SP 79 C can be used as the central control unit for a whole disk cutting system. The comprehensive processing facilities offered by the control console permit mastering from the original tape rather than a copy.

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The main functions and components provided by the control console are:

- A and B equalization and level control channels with manual and automatic switch-over. Cross-fade capability optional
- level monitoring on plasma display peak indicators (PPM) and standard U.S. vu meters
- scope monitoring of cutting stylus tip motion
- correlation coefficient meter
- high/low cut-off filters
- calibrated level control
- automatic banding unit (not with VMS 80)
- elliptical equalizers for low frequency cross-over
- provision for stereo reverberation send and return
- second output for simultaneous, fully equalized tape copy
- phase reversal, channel reversal
- digital production timer (automated)
- full jack field
- board-fade attenuator
- VMS lathe system remote control
- audio monitor controls with phase reverse, mono, and L and R muting
- wiring and relay controls for 4 noise reduction systems (optional) and 4 U 473 SP compressor limiter expanders

The control console comes in the form of a studio mixer. All operating panels consist of special plug-in modules (190 mm high, 40 or 80 mm wide) housing the sub-systems and functional units. Additional space is available behind filler panels for further equipment. A 17.5 inches area has been left on the left-hand side of the control panel for 19" rack mounting units.

A jack panel with 104 jacks provides access to the major component in- and outputs within the system, either for testing purposes or for insertion of additional equipment.

The switching functions of the control console are performed by relays and electronic switches. The switches are triggered by means of an electronically interlocked keyboard providing mutual key release within individual key groups.

A 5-digit LED production timer, automatically started from the lathe functions, is a standard feature for program timing during tape-to-disk transfer.

The inputs of the modulation as well as of the preview channels are provided with channel and phase reversal. Both modulation and preview channels are designed and pre-wired to accept noise reduction systems. Active attenuators are provided for level adjustment before and after the noise reduction system. These have a control range of ± 10 dB and can be adjusted in 0.5 dB steps. Both the program and preview signals are controlled in tandem by ganged precision step attenuators.

Dual-channel program equalizers with three selectable boundary frequencies each for low and high frequency equalization and a range of ± 15 dB are provided. They also feature eleven selectable frequencies for pres-

ence/absence equalization over a range of ± 10 dB. Boost or attenuation can be adjusted by means of eleven-step rotary selectors allowing for precisely reproducible settings. Three bandwidths (Q) for presence/absence equalization may also be selected.

The active attenuators and equalizers for the modulation and preview channels are provided in duplicate to permit A/B switch-over operation.

One plug-in module contains all the controls for A/B switch-over, which may be either manually by pressing the keys marked A or B, or automatically from the automatic banding unit on pressing the AUTOM key. In this operating mode, an automatic switch-over to the other program line occurs whenever the automatic banding unit causes a spiral to be cut. This facility allows the desired level and equalization parameter which have been established in a trial run, to be pre-set on the unused program path one title ahead. It has also been found useful to be able to make A/B comparisons between two equalizer settings during preparation work prior to a transfer in order to establish optimum equalization for each title of a program.

By means of the PREVIEW OFFSET level setting control the level of the preview signal can be boosted or reduced against that of the program signal in steps of $\frac{1}{2}$, 1, 2, 3, 4, 5, 6 dB. The setting of the control is indicated by multicolor LED's (For VMS 66/70 only. For VMS 80 a respective special plug-in module is available).

A switch insertable elliptical equalizer is provided for both the modulation and preview signals. As the largest amplitudes occur in the lower frequency range, the elliptical equalizer attenuates the vertical recording portion of the stereo signal by 6 dB/octave below a selectable frequency of 150 Hz or 300 Hz while linear frequency response of the lateral recording is maintained. Reduced space requirements make possible maximum playing time on the disk.

The next step in the signal processing path consists of a pair of two-channel high/low pass filters.

Program and preview channels are wired to take optional Neumann U 473 SP compressor limiter expander which can be factory installed on request. For operation with U 473 SP the control console is equipped with an additional limiter threshold control and a De-Ess switch.

In order to allow the addition of reverb during the mastering process, send and receive signals from reverberation chambers or units can be inserted after the compressor/limiters in the program channels. The necessary controls are contained in the special plug-in module mentioned above.

The tandem stereo fader is used to board fade modulation at the end of a cut. After the fader the signal is tapped via a buffer amplifier and may be fed to another recorder, so that the fully processed disk master program is available as a simultaneous tape copy, for cassette duplication, for example.

The control console output consists of two dual booster amplifiers in conjunction with the four-channel RELATIVE DISK LEVEL attenuator. The latter permits the output level either to be increased by 8 dB or reduced by 4 dB in 1 dB steps. Settings are indicated by multicolor LED's. To simplify operation, the meter range switching is coupled with this attenuator setting so that both output level reading and reading of the monitor signals returned from the SAL cutter drive logic are independent of the respective relative cutting level setting.

Instant change-over for the production of monophonic records is provided by the MONO TAPE and MONO MIX keys. The MONO TAPE key is used for transfer of half-track and full-track monophonic tapes. The MONO MIX key permits stereophonic tapes to be transferred for monophonic record production. In this case both channels are mixable for best mono balance.

Pressing the TEST OSC key switches the test oscillator to all four program and preview inputs. The oscillator offers six test frequencies for alignment of the entire transfer system. Its level is continuously variable by means of a potentiometer. Pressing the CAL key selects the fixed standard reference level.

Levels are indicated on a dual plasma display PPM indicator and two U.S. standard vu meters. For a sine wave test signal, the vu meters read 6 dB higher than the PPM's. Pressing the +6 VU key will attenuate the vu meter deflection by 6 dB so that the readings of the peak program meters and the vu meters are identical even for sine wave signals. This facility is particularly useful during alignment.

Phase correlation of the two signal channels is indicated by the U 479 correlation coefficient meter. With in-phase signals a +1 correlation is shown by ten green LED's, whereas ten red LED's will light up for -1 correlation, or total phase opposition. With one signal missing or with no channel correlation at all, only the yellow "Meter on" LED in the middle will be illuminated. Integration time can be decreased by pressing the FAST button on the panel.

An additional means for transfer monitoring is provided by the NTP 177-520 c monitoring oscilloscope. Its vertical deflection is controlled by the vertical recording portion, whereas its lateral deflection is controlled by the lateral recording portion of the program signal. As a consequence the motion of the cutting stylus tip is made visible on the monitor. The oscilloscope gives information on whether the stereo sound impression is balanced and properly phased.

A bank of monitor keys marked METERING connects all the instruments described above with the vital points within both the control console and the SAL cutter drive logic. The keys are mutually releasing and safeguarded against double actuation.

For transfer monitoring the signal selected by means of the METERING key bank is fed to the SAL monitor power amplifiers. The monitor path has optional provisions for the insertion of a quadraphonic matrix decoder. Using two additional power amplifiers allows four-channel monitoring.

The extreme operational versatility of the control console allows the mastering engineer to remain in one place nearly all the time. The whole transfer operation can be remotely controlled from the console.

All key-controlled functions of the VMS disk cutting lathe system are remote controllable from the console. Remote control is also coupled with the automatic banding unit which causes spirals to be cut between program bands as indicated by leader tape.

Remote control is also a possibility for the cutter drive logic whose controls have to be operated frequently during transfer. The BSB acceleration limiters contained in the SAL cutter drive logic are equipped with remote control for the BYPASS, OFF and ON operation modes.

Another SAL component, the SAB signal processor may be switched from RIAA-curve recording equalization to a frequency response suitable for alignment and calibration.

In addition, the SAL monitor selector MWS may be switched remotely between cutter feedback (FB) and pickup (PU).

Technical Specifications: 0,775V \pm 0 dB
(Modulation and preview channels)

Input impedance	\geq 4 kOhms balanced, floating
Recommended source impedance	\leq 600 Ohms
Nominal input level for 0 vu reading	+4 dB
Maximum input level	+21 dB
Output impedance	\leq 30 Ohms balanced, floating
Load impedance	\geq 300 Ohms
Nominal output level	+4 dB
Output level	0 dB ... +12 dB
adjustable in 1 dB steps	
Maximum output level	+20 dB
Signal to noise ratio (unweighted)	\geq 80 dB
in accordance with DIN 45405 (weighted)	\geq 80 dB
Cross-talk attenuation at 1 kHz (L/R and MOD/PREVIEW)	\geq 90 dB

Program Equalization:

Low-range equalization	
selectable at	40 - 60 - 100Hz
in steps of	\pm 2 - 4 - 6 - 9 - 15 dB
High-range equalization	
selectable at	7 - 10 - 14 kHz
in steps of	\pm 2 - 4 - 6 - 9 - 15 dB
Presence/absence equalization	
selectable at	175 - 250 - 350 - 500 - 700Hz
	-1 - 1.4 - 2 - 2.8 - 4 - 5.6 kHz
in steps of	\pm 2 - 4 - 6 - 8 - 10 dB
Bandwidth of the presence/absence filter	
switchable in three steps	wide, medium, narrow
Bandwidth in position wide	
switch position 10 dB	approx. 1 octave
Ratio of the bandwidth	
switch position wide, medium, narrow	1:0.5:0.25

Cut-off Filters:

High cut-off frequencies	6.3 - 9 - 12.5 - 16 kHz
Low cut-off frequencies	40 - 63 - 80 Hz
Filter attenuation	18 dB/octave

Tape 2 Feed:

Nominal output level	+4 dB
Maximum output level	+20 dB
Output impedance	\leq 30 Ohms balanced, floating
Load impedance	\geq 300 Ohms
Input impedance	\geq 8 kOhms balanced, floating
Nominal input level for 0 vu reading	+4 dB

Monitor:

Input impedance	\geq 8 kOhms balanced, floating
Nominal input level for 0 vu reading	+4 dB
adjustable in 1 dB steps through	
RELATIVE DISK LEVEL control	0 dB ... +12 dB
	(marked -4 dB to +8 dB)
Nominal input level for 0 vu reading	+4 dB
with TEST RECORD button	
pressed	-16 dB ... -8 dB
(independent of RELATIVE DISK	
LEVEL control position),	
potentiometer adjustable	
Nominal output level with VOLUME control	
full up	+4 dB
"Muting" control key (telephone key)	-20 dB
Load impedance	\geq 2 kOhms

Test Oscillator:

Test frequencies	40 Hz, 200 Hz, 1 kHz, 5 kHz, 10 kHz,
	16 kHz (VMS 70)
	20 Hz, 100 Hz, 1 kHz, 5 kHz, 10 kHz,
	16 kHz (VMS 80)
Maximum output level	+22 dB
Output impedance	\leq 20 Ohms balanced, floating
Load impedance	\geq 200 Ohms

Reverb Facilities:

Output REVERB SEND	
(REVERB PLATE IN)	unbalanced, mono mix
Nominal output level for 0 dB PPM reading	+6 dB
Required reverb unit input impedance	\geq 4 kOhms
Input REVERB RETURN	
(REVERB PLATE OUT)	unbalanced, stereo
Input impedance	2 kOhms (tandem controls)

Power supply for the control	
console	100 ... 240 VAC (strappable),
	50/60 Hz, approx. 150 VA

Dimensions	1510 x 900 x 1190 mm
(width x depth x height)	(approx. 60" x 36" x 47")
Weight	approx. 175 kgs (385 lbs)

Errors excepted. Subject to changes