NEOTEK SERIES III

Introduction

A studio owner's choice of master recording console is of fundamental importance. The console forms the electronic heart of the studio and is the one piece of equipment that most critically affects the basic technical quality of the final product. This choice is complicated by the fact that manufacturers' claims and specifications are an unreliable basis for comparative judgements: they are highly subject to enhancement. In the absense of direct experience with each alternative it is difficult to evaluate the merits of one console versus another. We hope this material will serve to introduce the new Series IIIC and the concerns which have gone into its design and manufacture, but no literature can supplant a hands-on evaluation. We confidently solicit this most critical of tests.

Circuits

NEOTEK is the established leader in the application of advanced analog circuit design techniques to professional audio consoles. For over eight years we have exclusively produced consoles that are completely transformerless from inputs to outputs and in fact transformerless NEOTEK consoles were producing Grammy-winning albums years before others began offering optional transformerless functions. Among other increasingly popular features first seen on NEOTEK consoles are 3-mode solo and state-variable parametric equalizers. NEOTEK's designers have continued the years of painstaking development which has kept NEOTEK consoles at the leading edge of audio circuit design. The lead this experience has given us accounts in part for the reputation NEOTEK consoles have earned for clearly superior sonic quality.

There is more to contemporary console design than getting the iron out; this can even be a backwards step, as some new commercial designs prove. Advances in gain structure and impedance optimization, frequency compensation techniques, and grounding systems are as important as circuit topology in maintaining NEOTEK's leadership. It goes without saying that all console stages exhibit absolute stability and will operate with impunity in r.f. fields well in excess of 1 volt/meter.

Even the FET switching in the IIIC reflects refinements beyond standard circuits including those based on dielectricly isolated IC switches. Not only are the NEOTEK switches silent, but they are sonically transparent even when many stages are cascaded (a test we employ in their development).

Although NEOTEK has become known among designers for its refinement of op-amp circuitry, we are now extending the state of the art in discrete designs in applications where the very best op-amps, IC or otherwise, reach their limits. Our instrumentation amplifier mic pre is just one example. Exotic topologies using components unavailable until recently yield stages with half the noise of the NE5534 or OP-37, twice their output voltage, and over ten times their speed. This results in a stage that will produce +26dBu at over 200 volts/microsecond with a dynamic range of 130dB. These new circuits are completely complementary cross-coupled and operate pure Class A. Like all NEOTEK designs their power bandwidth exceeds their small signal bandwidth so transient distortion phenomena are completely eliminated. There is simply no comparable topology in any other console. Most importantly, these circuits were developed because they offer audible advantages of which conventional circuits are incapable.

Systems

The Series III is an in-line monitoring console in which all of the basic signal flow and metering is configured by logic-controlled solid state switching. Only a single master switch is required to change the entire console from RECORD to OVERDUB to MIXDOWN modes. Each input – output group is comprised of an input/monitor module containing NEOTEK's acclaimed transformerless mic preamp, a four-band multi-mode equalization section, six auxiliary buses, and monitor functions. There is an associated assignment/output module and peak/VU light column meter, and below the write-on strip is a fader module which may optionally accomodate VCA grouping or automation functions.

As the master recording console of a multitrack studio the Series III handles signals relating to microphones, tape machine inputs and outputs, headphone feeds, auxiliary signal processing equipment, and other interconnected facilities. What distinguishes the Series III is the ease with which any of these signals may be called up, manipulated, and auditioned.

On the Input module, the availability of a readily accessible line gain control, dual mute system, split equalizer, and stereo solo as well as in-place solo, all contribute to the control an engineer can exercise or ignore as he chooses. In the output section the six equalized auxiliary bus masters which solo in stereo, the cue system submixer, flexible meter and peak indicator controls, and the unusually comprehensive monitor section and patch bay are further indications of the power that has been designed into the operating system of the Series IIIC.

This highly refined flexibility allows the complicated routings common to contemporary mixdown sessions to be achieved faster and easier (and with fewer patch cords) than with other consoles, with or without automation.

The stereo solo system of the III is an uncommon asset on multitrack consoles but it is essential for professional control when cutting stereo drum tracks, stereo piano, stereo strings, horns, or chorus. Even details as small as providing calibrations on every control to make the console faster to reset show the designed-in concern for the practical problems which engineers face.

The basic control offered by the Series III requires no manual switching or patching to handle all normal recording or mixing functions. A guest engineer can get to work immediately and easily learn to quickly give artists and producers their every request. The highly refined systems engineering of the Series IIIC and its logic-controlled FET switching ultimately means value; it inspires the confidence that results in repeat bookings from producers, artists, and free-lance engineers.

Sonic performance

Although the noise and distortion specifications of NEOTEK consoles are by far the best in the industry, it is more significant that in every direct comparison with other consoles without regard to price, the sound quality of NEOTEK has proven superior without exception.

NEOTEK consoles are used for the finest audiophile recordings such as those of TELARC Records, whose Grammy-winning catalog is considered to hold the finest discs ever recorded. TELARC attribu s much of their technical quality to the choice of console, which the found to be the only one superior in terms of noise, distortion, and bandwidth to the preeminent digital recording system they employ. They comment not only on superlative measurements, which technicians reconfirm before every session, but also on an outstanding sonic clarity that distinguishes their NEOTEK console from others they had previously considered. When the balance of the system is sufficiently accurate to resolve console differences, critical engineers universally report this readily apparent sonic superiority.

It is for such reasons that well-known artists prefer NEOTEK consoles. Such professionals are familiar with a wide variety of equipment and are in the best position to make critical judgements. In recent months Series III consoles have been chosen for the personal studios of Chet Atkins and members of Fleetwood Mac, Supertramp, and the Doobie Brothers, among others. Their selections are significant because of the thorough evaluations that were performed: pointed conversations with current owners, performance measurements by top technicians, and critical listening tests that included running album sessions on NEOTEK consoles.

These evaluations concerned the construction and operational features of the console as well as its sonic merits – such professionals won't tolerate ill-conceived functions that fight creativity. In sum, the operational system of the Series III along with its superlative performance are an unbeatable combination – one that will set the standard for many years.

Prospective purchasers owe it to themselves to carefully study the operational features of each console under consideration, to work through common and uncommon situations. They should consult previous owners and above all listen critically to the consoles and their recorded product. A console's basic price is seldom an index of its value. NEOTEK owners have repeatedly shown that a console that sounds great, makes engineers look like heroes, and quickly gives producers and artists what they want is a far wiser choice than a console whose main attraction was an initial low price or a high media exposure.

The purchase of a recording console is also the initiation of an interdependent relationship with the console manufacturer and its dealer, and quality is as important in this regard as with the console itself. From every standpoint NEOTEK consoles offer outstanding value. We invite, and challenge, the most critical comparisons.

Immediately above each of the first 24 input modules is a multisegment **LIGHT COLUMN METER** whose indications appear through a black-out face panel. Each meter may be switched to peak or VU response, with the peak mode indicated by an LED and having 10dB less sensitivity so that readings remain appropriately on scale. A meter may be switched individually by a touch-sensitive button on its face or all meters may be set simultaneously with master controls.

The **MIC PREAMP** is the latest evolution of the transformerless design that NEOTEK introduced to the industry eight years ago. Its unique components and topology give it the lowest noise and distortion of any mic preamp today. No pad is required because the input will accept over +12dBu (3 volts) without adverse effects. 48V phantom powering is provided.

The gain of the **LINE INPUT** is continuously adjustable but has a calibrated detent position at its normal operating point.

The **MIC/LINE REVERSE** switch changes the selection of channel input from that determined by the console master status logic. A Mic input is indicated by a red LED and a Line input by green.

Each channel responds to the A mute group unless the **MUTE B** switch is latched. Controls in the master section determine the effect of master mutes and in-place-solo functions on each of the two groups. For example, several channels may be taken in or out of a mix with a single switch, or channels used as echo returns may remain unmuted by in-place-solo of another input.

1 • 2 POST changes the source of the stereo auxiliary assignment on buses 1 and 2. Though normally used for cue and thus derived pre-monitor, they switch to post-fader for use as stereo echo sends.

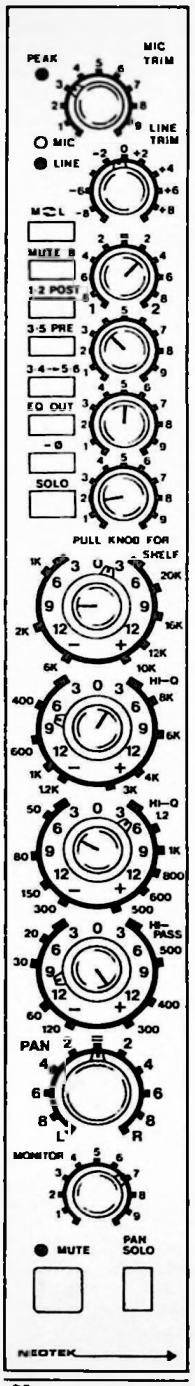
3 • 5 PRE moves the source of sends 3 and 5 to pre-fader. In record and overdub modes, this will move them out of the monitor channel and into the mic channel. Since either bus may easily be combined with the cue mix in the master section, an artist can hear his live mic on top of his old track at any relative level. Another use is simply to give pre-fader echo sends on buses 3 and 5.

3 • 4 TO 5 • 6 causes the 3 and 4 send controls to feed buses 5 and 6. This is convenient at mixdown when it is frequently desirable to have additional echo sends.

The **PHASE REVERSE** switch silently reverses the polarity of the main channel signal, thus it may be used when mixing as well as when recording, as an artistic tool or to correct previous errors.

The upper **SOLO** switch effects a mono solo of the main channel signal, such as a single microphone among a mix going to one tape track. The mix itself may be auditioned with pan solo of the monitor function.

The Series IIIC four-band **PARAMETRIC EQUALIZER** uses the multi-mode state-variable topology that was seen first on NEOTEK consoles. Years of optimization have resulted not only in the exceptional musicality for which NEOTEK equalizers have become known but a network that is totally free of aberrations or interactions at any combination of control settings. The upper knob of each concentric section controls the amount of boost or cut and when these are in their normal positions the EQ section provides four bands of just-over-one octave peak/dip functions. The 20:1 frequency ranges offer wide overlap and the smooth sound of each band is maintained at frequency and amplitude extremes. All controls function smoothly and produce the expected results.



When the high band boost/cut knob is pulled upward, the filter mode silently changes to a shelving characteristic without effect on frequency or amplitude response settings. Similarly, the two mid bands switch into high-Q (narrow) modes for special effects, again without affecting other settings. The low band switches to a continuously variable high pass filter with optimally flat 12dB Butterworth characteristic.

The **PAN** function is a dual control with sine-cosine characteristic which feeds the 2-mix. Its source is either the monitor control, in record or overdub modes, or the channel fader at mixdown.

In record mode the source for the **MONITOR** pot is the correspondingly numbered multitrack bus output and in overdub it becomes the multitrack return. In these two modes the channel cue and echo sends relate to the monitor pot, not necessarily to the fader. By this means, the engineer can establish cue, echo, and monitor mixes independent of recording levels (which are controlled by the fader and mic gain and are indicated by the channel meter of the track to which the input is assigned). These mixes need not be readjusted as tracks progress from being recorded to having been recorded. Punch-ins will be heard in continuity as the tape machine switches from sync to record and back to sync.

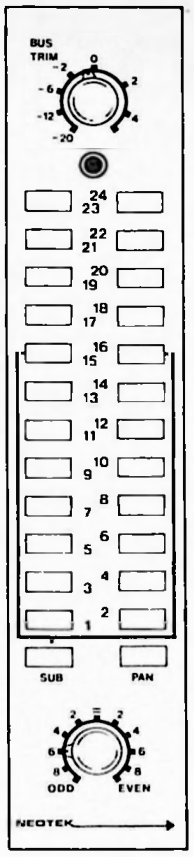
The **MUTE** switch silently removes all post-fader sends from their buses. Because an input is actually removed from the 2-mix buses as it is muted, the noise gain of the 2-mix drops. This unique muting method can mean a 15 to 30dB improvement in noise performance over other consoles. The logic-controlled mute function also responds to master controls: **MUTE A, MUTE B, MUTE ALL, MUTE LOCK,** and **IN-PLACE-SOLO** (an exclusive mute function which mutes all channels except the one soloed). The mute function does not affect the fader output in record or overdub modes. This powerful logic control does not require VCAs or an automation system for its effectiveness. An LED indicates a muted channel.

PAN SOLO effects a stereo solo function of the output of the pan pot, whether its source is the monitor or fader. It is a true stereo solo and does not affect operation of other channels. A stereo solo of monitor channels is crucial for making judgements when recording stereo drums, stereo strings or horns, piano or chorus, yet the Series III is one of the few consoles which offer it. If the master in-place switch is engaged, all input channel pan solo functions become in-place-solos and in this case cause all un-soloed channels in either or both (as selected) mute groups to mute. The engineer will then hear the soloed channel(s) and only its returned echo. This function does affect other channels, but in record or overdub it affects the monitor outputs, not the faders, and so has no effect on signals being recorded. For such reasons it is more powerful than in-place-solo achieved with automation systems or VCA groups.

Beneath the main modules, in a massive frame extrusion, is a durable melamine laminate write-on strip on which channel numbers are engraved.

The fader associated with each input channel is mounted on a separate panel; it may easily be changed or serviced. A four-inch semi-sealed conductive plastic fader is standard but many options may be retrofitted in the field: Penny & Giles faders, VCA subgrouping faders, and today's most popular automation system, the Valley People Fadex and 65K Programmer.

TRACK ASSIGN / OUTPUT



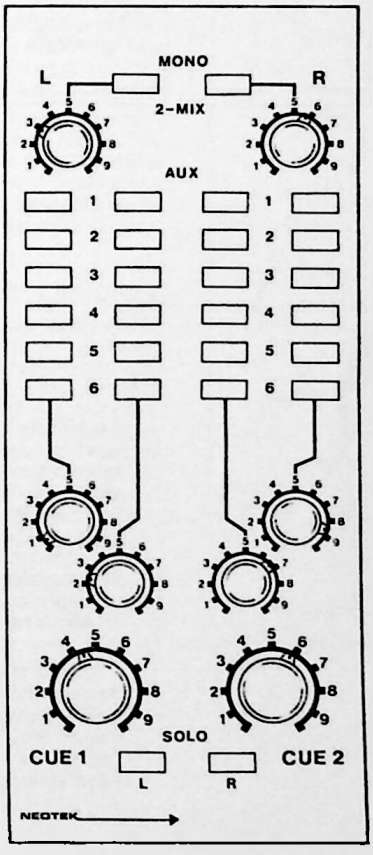
The **TRACK ASSIGN** module in each input group contains a multitrack bus combining amp with its gain trim control, and push-button switches to assign the post-fader output of the associate input module to any of the 24 multitrack buses. Such assignments are made as a single mono level unless the **PAN** switch is engaged; in this event assignment to add/even pairs of tracks is made through the pan control on the assignment module. When assigned to one pair of tracks, this pan pot has a sine-cosine characteristic with -3dB center. If a -6dB center is desired, assignment to an additional unused pair of buses will yield that characteristic.

In complex mixdown sessions the console signal flow logic allows the multitrack buses to be used as additional echo sends. This results in an additional 24 mono or a dozen extra stereo echo buses. With the pan switch engaged, the pan control can serve as a pan or as a level control if only a single assignment is made. The ready accessibility of each bus master gain control increases the utility of this technique, as it will serve both as a master level control and to positively prevent the possibility of bus overload.

The **SUB** switch allows yet another use of the multitrack buses which will make mixdowns more effective. When engaged, the output of the main pan pot on the input module is removed from the 2-mix buses and may be assigned to any of the first sixteen multitrack buses, typically in stereo pairs; these buses then serve as submasters. The input module remains unmuted, so its echo sends are available to generate a submaster echo mix. This echo may be returned through an input channel and brought back into the subgroup so that it follows both individual faders and the subgroup master. Alternatively, the optional submaster modules provide returns for both the stereo submixes and the echo as well. Eight buses remain unaffected by the sub switch and so remain available as echo buses for the subgroups – in stereo if the pan switch is used. This highly effective submastering system does not require VCAs or automation for its function, but neither does it conflict if either of these options has been fitted.

Each track assign module has a black button on the assignment switch that corresponds to its channel and track number. Those modules beyond 24 have only white buttons and no bus trim control or associated light-column meter.

CUE MASTER



The design of the **CUE MASTER** module is such that each cue has two inputs and each of these inputs may be any, or all, of the **AUX** buses and/or the 2-mix in stereo or mono. This module then is a small mixer used to select the inputs and levels that make up **CUE 1** and **CUE 2**. This may seem complex, indeed it can be when necessary, but in most cases **AUX 1** and **2** will be selected for **CUE 1** and **2**. The small pots have center detents and are seldom touched. Yet, the first time the talent asks, "Can I have the whole mix in stereo with the snare up a bit, my old tracks in stereo and my live mic down the middle with a little more reverb, and I don't want to hear the punch-in," just smile and give it to him without hesitation or patch cords.

The 2-mix can be used for stereo cues or either side may be sent to the mono 2-mix. Any aux bus can be added in, if desired, and the whole mix monitored with its stereo solo.

This module may also be used at mixdown to get, for example, pre- and post-fader sends from every input module into the same stereo echo mix. It has enough other uses to make it worth its weight in gold patch cords.

This module is normally mounted at the rear of the master section.

MUTE ALL actuates the logic-controlled mute functions of every input channel in both mute groups. Because it does not mute echo returns, its effect will be that of causing the main program to silently vanish from the 2-mix while any returned echo dies out slowly. The logic-controlled functions of the Series IIIC operate apart from automation or VCAs: they afford the engineer a substantial amount of operational control – nearly all of the benefits of automation without any of its drawbacks or cost.

IN-PLACE MUTES A and **IN-PLACE MUTES B** select which one, or both, of the mute groups will be affected when an in-place solo function is used. If, for example, input channels being used as echo returns (to provide equalization, recirculation, a large fader, or for whatever reason) are assigned to **MUTE B**, in-place solo on **MUTE A** will allow the engineer to audition inputs with their echo wherever that echo is being returned. Once this set-up is made, it requires no additional attention each time the engineer uses an in-place solo.

Latching the **IN-PLACE** switch will mean that any pan solo switch used on an input channel will instead cause an in-place solo. In-place solo is an exclusive mute, that is, it actuates all other logic-controlled mutes and leaves the soloed input(s) remaining in the mix along with only their own returned echo, since input channel mute kills echo sends as well as the 2-mix feed. The enginner may then audition the input module and its returns together in their full stereo spread at the same level and pan they have in the overall mix. This function may be used in the monitoring mix when recording (as well as its customary use when setting up a mixdown) because it will not interrupt the multitrack feeds. The Series III is the only in-line monitoring console able to offer this useful function.

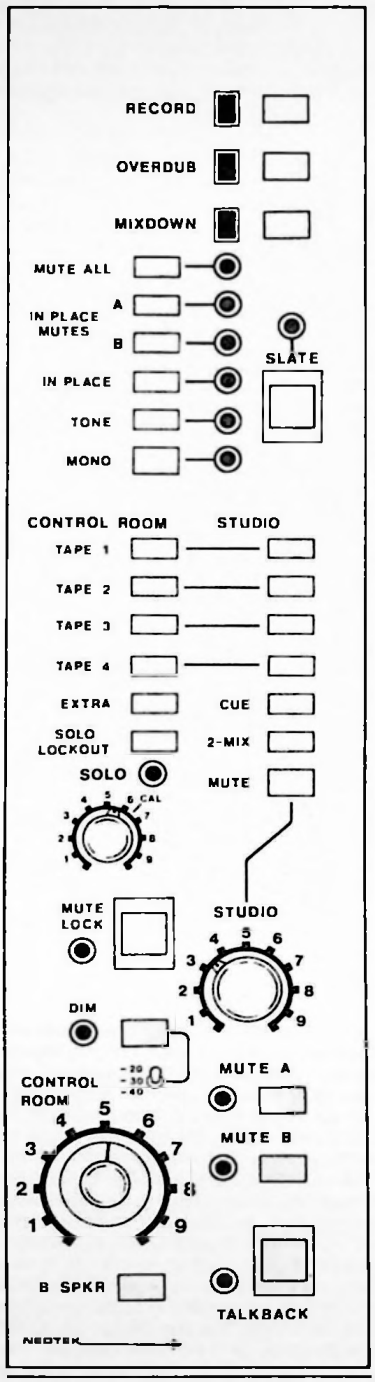
TONE turns on the oscillator and the **DIM** function but not the talkback mic. This latching switch is used to apply tones to the head of a 2-track master, align the multitrack machine, and so forth.

The **MONO** switch silently blends the left and right sides of the control room signal, whatever its source, while appropriately dropping the level. It is also logic-actuated along with its LED indicator whenever a mono solo function is used.

The **CONTROL ROOM INPUT SELECT** switches can call up five stereo inputs in place of the 2-mix. Every input and output of the stereo tape machines appears at normalled-through jacks in the patch bay, facilitating direct 2-track transfers, use of 2-tracks for echo delay, and so forth. Full monitoring capability is retained. Note that cues and echo send/returns are monitored in stereo using their stereo solo functions.

SOLO LOCKOUT interrupts the solo logic, permitting a number of channels whose solo switches are all latched to be put into solo mode with a single button.

An LED indicates that any **SOLO** function is operative and a stereo trim of the solo level is provided. This control has a calibrated unity-gain position, should it be desirable to accurately meter soloed signals.



The light-touch **MUTE LOCK** button engages a logic function which suspends the effects of any changes of input channel mutes until the mute lock is re-toggled. The mute LEDs will change, however, to indicate what will happen when mute lock is released. This function operates irrespective of the mute groups to allow an infinite number of groups of channels to be set up and then be taken noiselessly in or out (or both) of the mix. It is equivalent to electronic editing. In addition to its use for grouping mutes in multitrack mixdown, it can also permit instant change of level, EQ, and echo sends on tracks returned through pairs of input channels. This is equivalent to a scene change in film or video post production work.

DIM is also a logic-controlled switch; it drops the level of the stereo control room by the amount selected by its associated switch and allows immediate return to the exact previous level.

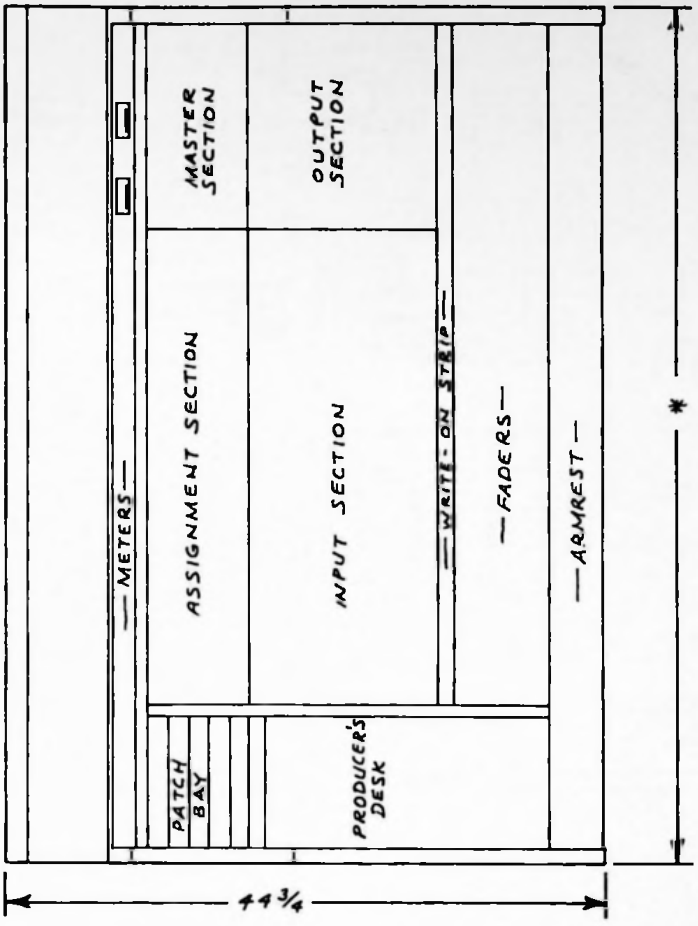
Absolute tracking of the **CONTROL ROOM LEVEL** control is critical. The precision stepped attenuator used in NEOTEK consoles offers better than 1/2dB matching over most of its range. Its 32 positions allow high resolution settings and yet easy return to chosen levels. In addition, its unique construction has been designed specifically to handle high quality audio signals.

The **B SPEAKER** switch mutes the main monitor speakers and routes the control room signal to an alternate amp/speaker reference.

The three interlocking switches, **RECORD**, **OVERDUB**, and **MIXDOWN** direct digital logic-controlled FET switches in each input module to select the appropriate input (mic or line) and to configure the cue, echo, monitor, meter, and 2-mix source appropriate to each operating mode. In the record mode monitoring, cue, echo, and track meters all refer to the console multitrack bus outputs. Input channels are in the sequence: mic pre- equalizer- fader- track assignment. In overdub mode, routing is identical except that the monitor and cue/echo functions refer to the multitrack returns. These returns will typically be previously recorded tracks played back from the recording head (sync) or will be the returned tape machine inputs (console outputs) on those tracks being recorded. By this scheme, the cue, echo, and monitor mixes do not change between record and overdub or during punch-ins. In mixdown mode the main channel sequence is: tape return (from playback head)- equalization- fader- pan- 2-mix. Cue, echo and metering then refer to the main channel and the monitor is inoperative. There are many additional subtleties, but all of this basic restructuring is controlled entirely by selecting one of three pushbuttons.

The momentary **SLATE** switch applies the talkback mic and oscillator to the buses and talkback to cue or studio while simultaneously actuating the control room dim function.

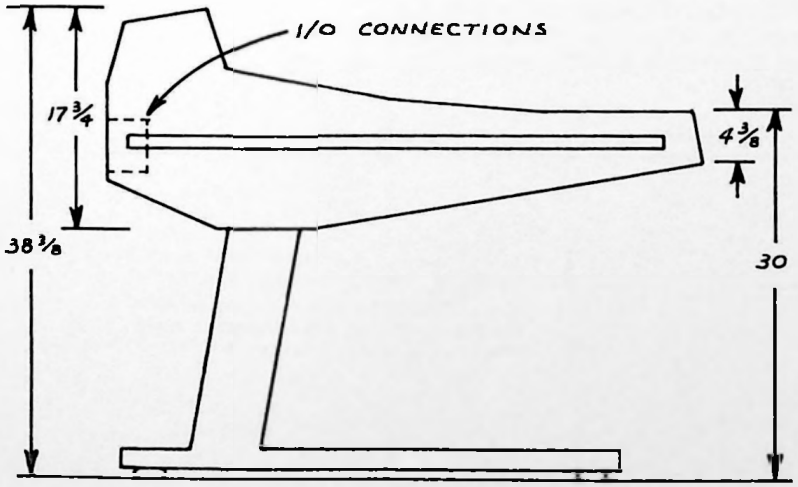
The **STUDIO INPUT** selector switches allow sending the stereo cue or 2-mix signals to the studio playback speakers as well as any of four 2-track returns.

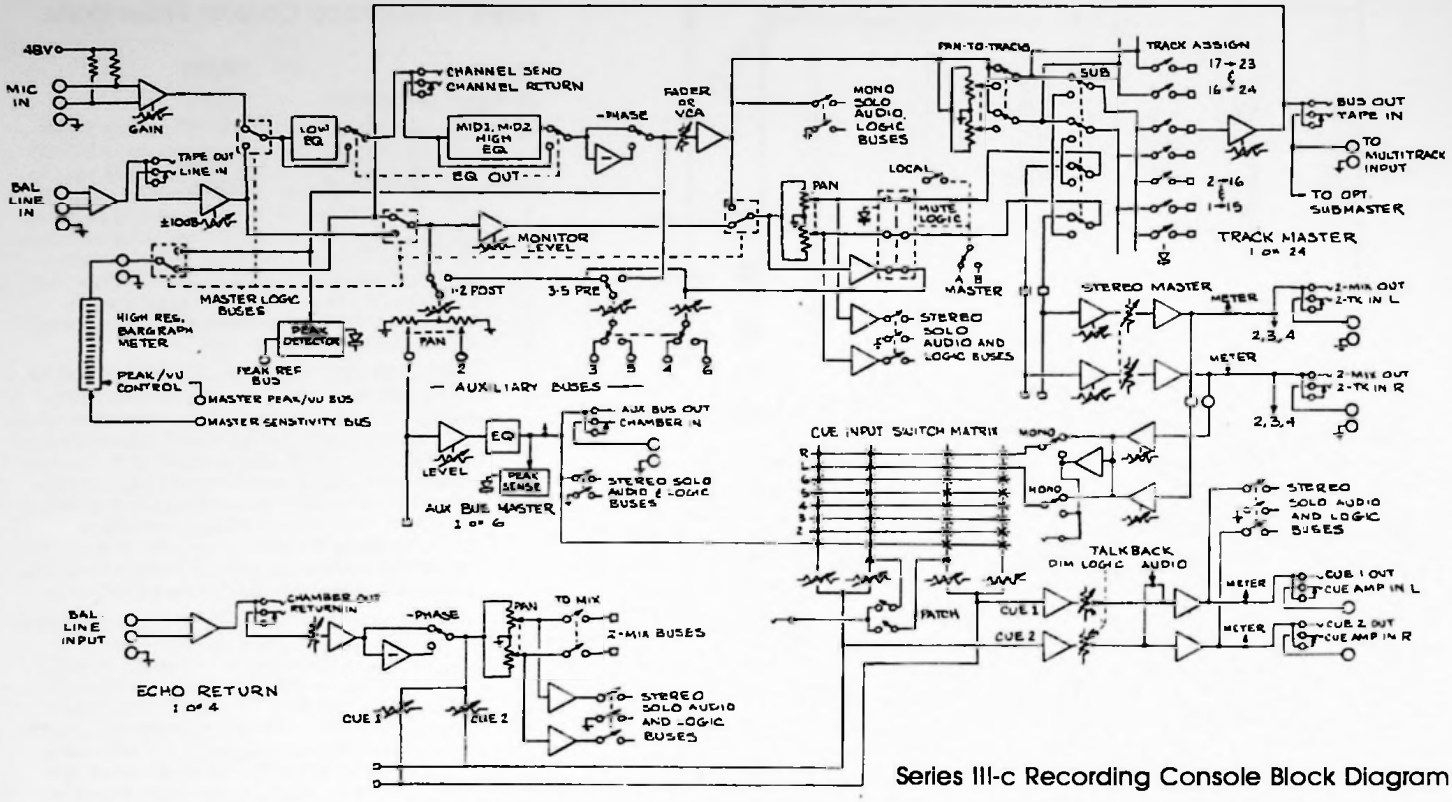


Series III Recording Console Dimensions

Format	Width
28 input, 24 output	80¼"
32 input, 24 output	87⅜"
36 input, 24 output	97⅜"
40 input, 24 output	104½"

Tolerance ⅛"





Series III-c Recording Console Block Diagram

Specifications

Manufacturers' claims and specifications are the least reliable basis on which to evaluate console performance; they are highly subject to enhancement. NEOTEK has long contended that excellent performance specifications are the consequence, not the goal, of superlative design. Our consoles have produced gold albums, Grammy-winning albums, and audiophile albums both digital and analog of the highest caliber; they are used whenever engineers demand maximum quality. It is also true, however, that when measured from input to output and compared to all other consoles, in every case NEOTEKs are demonstrably superior in terms of noise, distortion, and dynamic range. More importantly, after years of intensive listening comparisons by the most critical engineers one fact has been firmly established: when it comes to sonic quality, nothing at any price beats a NEOTEK.

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Series III-C Recording Console		List Price
Format	28 input, 24 output	39,840.00
	32 input, 24 output	34,440.00
	36 input, 24 output	47,415.00
	40 input, 24 output	51,015.00
Options	VCA module, substituted for standard fader module	190.00
	VCA submaster module	225.00
	Dual stereo submaster group, including two stereo fader modules	725.00
	Additional 56 point patch bay, wired for additional balanced lines	450.00
	Additional 72 point patch bay, wired for additional balanced lines	575.00
	Tape machine remote	175.00
	Multiple pin input/output connectors	Quotation
	Integral producer's desk	Quotation
	Leg set	750.00
Expansion Modules	Input group, including track assignment module and fader module	850.00
	Echo return pair	390.00
	VCA module	240.00
	VCA submaster module	225.00
Accessories and Spares	Input module	695.00
	Power Supply	950.00
	Mono fader, Penny and Giles series 3000	85.00
	Stereo fader, Penny and Giles series 3000	130.00
	Input extender card	50.00
	Submaster extender card	50.00
	Master section extender card	50.00
	Track assignment extender card	50.00
	Patch cords, specify length, 12 inch or 24 inch	14.00
	Flight case, for any standard format and power supply	995.00

Notes

1. Consoles may be ordered partially filled. Deduct each input group not required.
2. Price of console includes: power supply, bargraph meters, Mechanical VU meters on the 2-mix, Penny and Giles series 3000 faders, patch bay, punch block input/output connectors, punch block insertion tool, and solid oak frame.
3. Exotic hardwoods are available, contact the factory for pricing and delivery.
4. Larger formats are available, contact the factory for pricing and delivery.
5. Crating and freight are additional.
6. Prices are effective November 1, 1982, given in United States dollars, and are subject to change without notice.