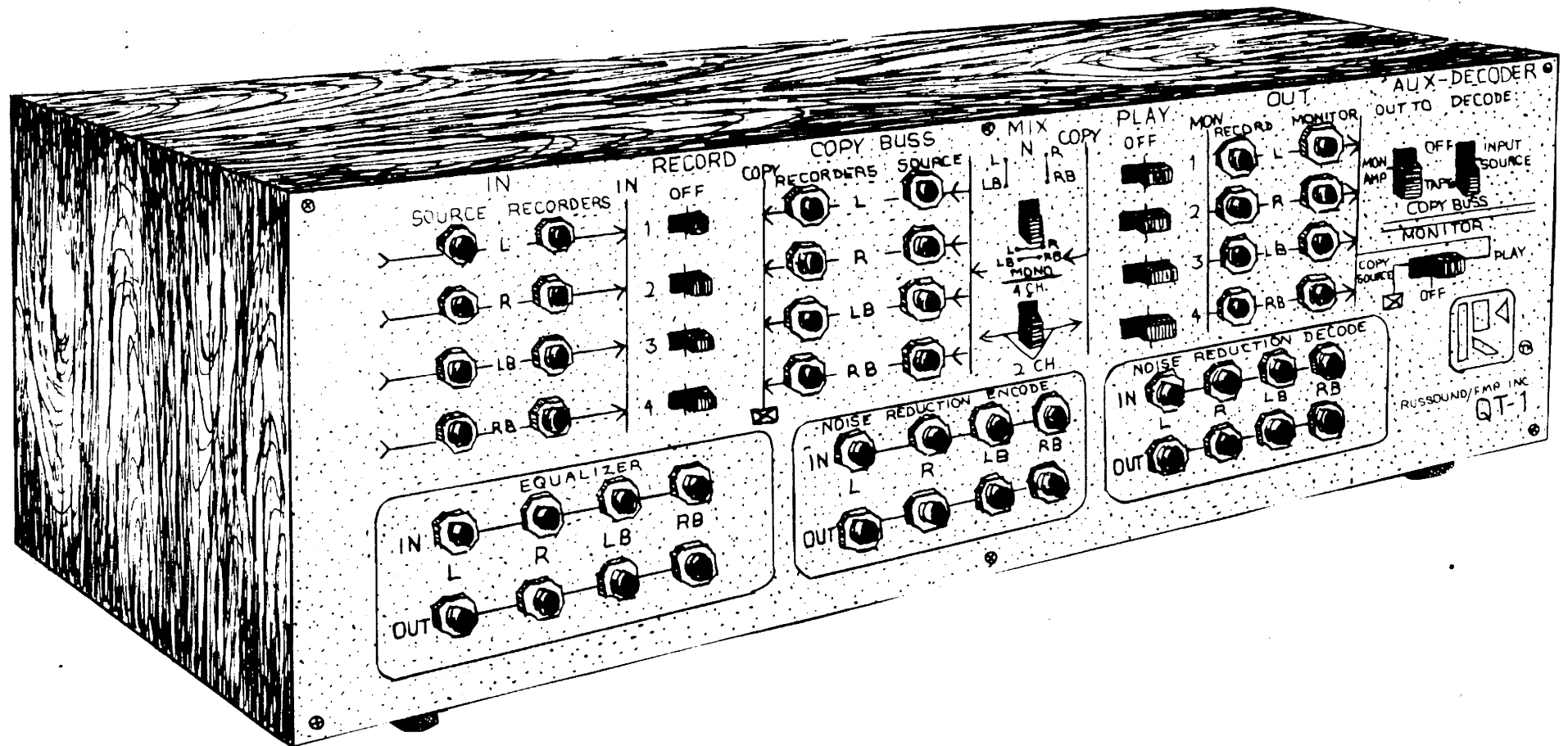


OPERATION AND ENJOYMENT MANUAL

RUSSOUND/RMP, INC. MODEL QT-1



Price-\$2.00

INTRODUCTION

The following information will help you to obtain maximum benefit from the convenience and flexibility of the QT-1 switching control center, thus greatly enhancing utilization and enjoyment of your high fidelity system.

The QT-1 connects to the audio system in the same fashion as a single tape recorder. The input and output jacks of the QT-1 connect to the tape monitor system of your existing pre-amplifier or receiver. Switching and jack panel facilities expand the tape monitor to accommodate up to 4 tape recorders, and interface accessories such as Dolby or dbx noise reduction systems, graphic equalizers, reverb, 4-channel decoders, etc. The following information is provided to aid understanding of the circuit so that operation of your QT-1 will be self evident, without need for frequent referral to this manual when changing set-ups.

HOW IT WORKS

A simplified schematic of the QT-1 appears on the facing page. Switching for the LEFT FRONT channel only is shown, along with one of the four each input and output selector switches for the recorders. Switching for the 2 - 4 channel modes and MIX can be traced on the full schematic at the back of this manual.

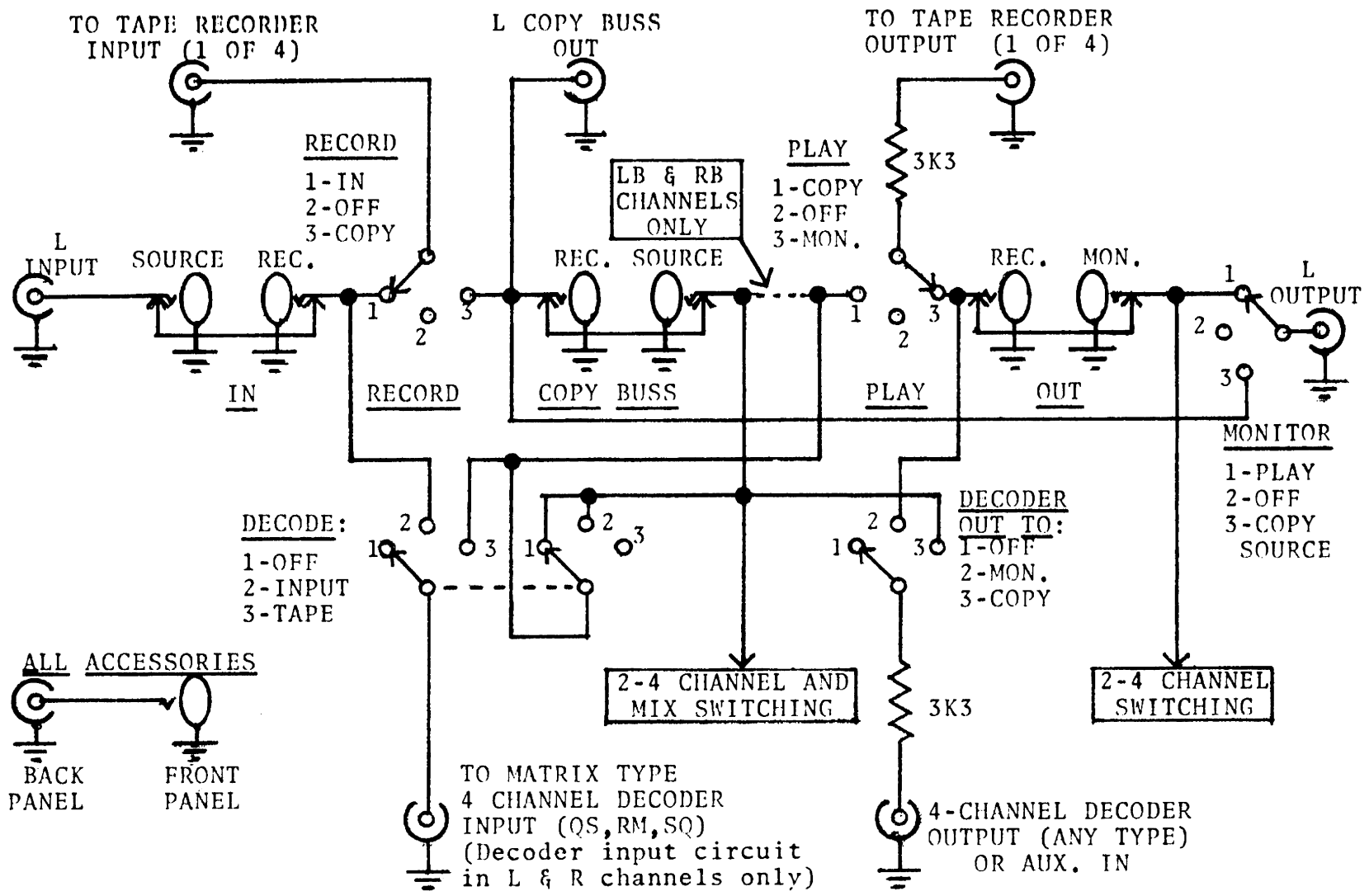
PLAY: Operation of a QT-1 PLAY switch to the MON (monitor) position connects a recorder directly to the output of the QT-1 and to the tape monitor input of the amplifier through the monitor switch when in the PLAY position.

RECORD: A RECORD switch at the IN position connects a recorder input directly to the QT-1 input and to the amplifier tape monitor output. Music from your preamplifier (FM, AM, phono, etc.) can be recorded.

RECORD & MONITOR: Operation of both the QT-1 RECORD and PLAY switches for the same tape recorder to IN and MONitor positions respectively will permit recording on a selected machine, and monitoring the recorder output. Comparison of in and out sound quality from the recorder can be made by operation of the monitor system of the recorder.

COPY: When the PLAY switch is in the COPY position, output of the selected tape recorder is connected to the COPY BUSS. Placement of the RECORD switch for another recorder in the COPY position will connect the input of that recorder to the same COPY BUSS, so that tapes can be duplicated.

QT-1 SIMPLIFIED SCHEMATIC
(LEFT [L] CHANNEL ONLY SHOWN)



ALL ACCESSORIES
BACK PANEL FRONT PANEL

2-4 CHANNEL AND MIX SWITCHING

2-4 CHANNEL SWITCHING

TO MATRIX TYPE
4 CHANNEL DECODER
INPUT (QS, RM, SQ)
(Decoder input circuit
in L & R channels only)

4-CHANNEL DECODER
OUTPUT (ANY TYPE)
OR AUX. IN

DECODE:
1-OFF
2-INPUT
3-TAPE

DECODE
OUT TO:
1-OFF
2-MON.
3-COPY

MONITOR
1-PLAY
2-OFF
3-COPY
SOURCE

RECORD
1-IN
2-OFF
3-COPY

PLAY
1-COPY
2-OFF
3-MON.

LB & RB
CHANNELS
ONLY

TO TAPE RECORDER
INPUT (1 OF 4)

L COPY BUSS
OUT

TO TAPE RECORDER
OUTPUT (1 OF 4)

L INPUT

SOURCE

REC.

IN

RECORD

REC. SOURCE

COPY BUSS

PLAY

REC. MON.

OUT

L OUTPUT

3K3

3K3

MONITOR: The MONITOR switch is normally used in the PLAY position. When making copies from one recorder to another, either recorder may be auditioned by use of this switch. In the PLAY position of the MONITOR switch, the copying recorder can be monitored when its associated PLAY switch is in the MON. position. Operation of the MONITOR switch to the COPY SOURCE position will connect the monitor amplifier to the output of the source recorder through the COPY BUSS, at the input of the copying recorder.

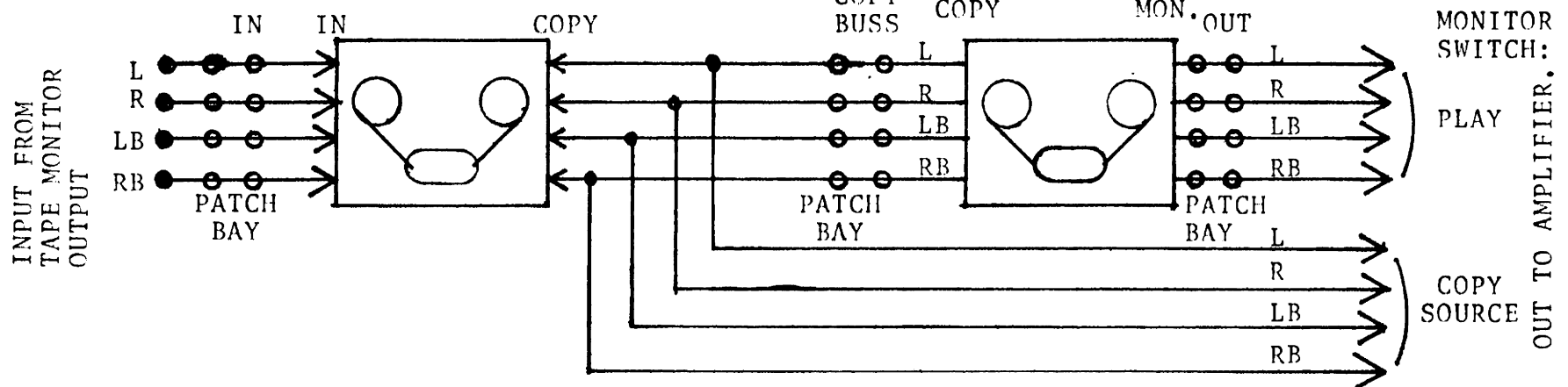
DECODER: The DECODE switch controls the input to a 4 channel decoder of the matrix type (SQ, QS, RM). It will connect the decoder to the input of the QT-1 (the tape monitor output) for decoding of appropriate material from records, FM, or to the output of a 2 channel tape recorder for either decoding or synthesizing 2 channels to 4.

DECODER OUT TO: Output from a 4 channel decoder of any type, or any auxiliary source, is directed to either the monitor amplifier or the tape COPY BUSS for taping through this switch. Circuit arrangements are such that it is possible to decode a 2 channel tape to 4 channels, and record the 4 channels on another machine.

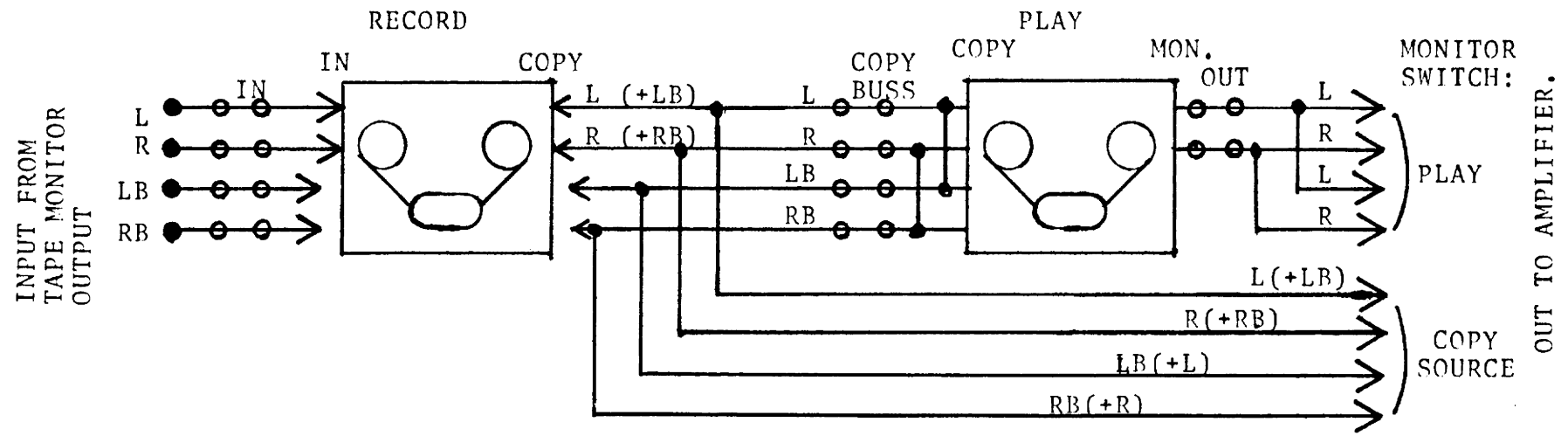
JACK PANEL: The panel mounted miniature phone jacks are a switching type, transferring connections when a plug is inserted. Audio at the IN, COPY BUSS, and OUT pairs of jacks is connected straight through the jacks to the switches when no plugs are used. Insertion of a plug disconnects the through circuit and transfers the audio to the plug tip. Thus, for example, if a plug is inserted into the SOURCE jack at the IN group, audio from the tape monitor out will be disconnected from the recorder input and transferred to the patch cord. Likewise, a cord plugged into the RECORDERS jack will disconnect audio from that jack, and transfer the recorder input to the plug. The free cord ends may then be plugged into other equipment. Use of patch cords makes possible insertion of additional equipment, re-routing signal, crossing channels, etc.

MIX & 4 CHannel - 2 CHannel SWITCHES: (Not shown on the simplified schematic.) These switches connect the 4 channels together in a manner allowing intermixing of quadraphonic, stereo, and mono recorders and equipment, and controlling the manner of mix when dubbing 4 channels to 2, or 2 to monophonic. The following block diagrams illustrate the nature of the connections in each mode of operation.

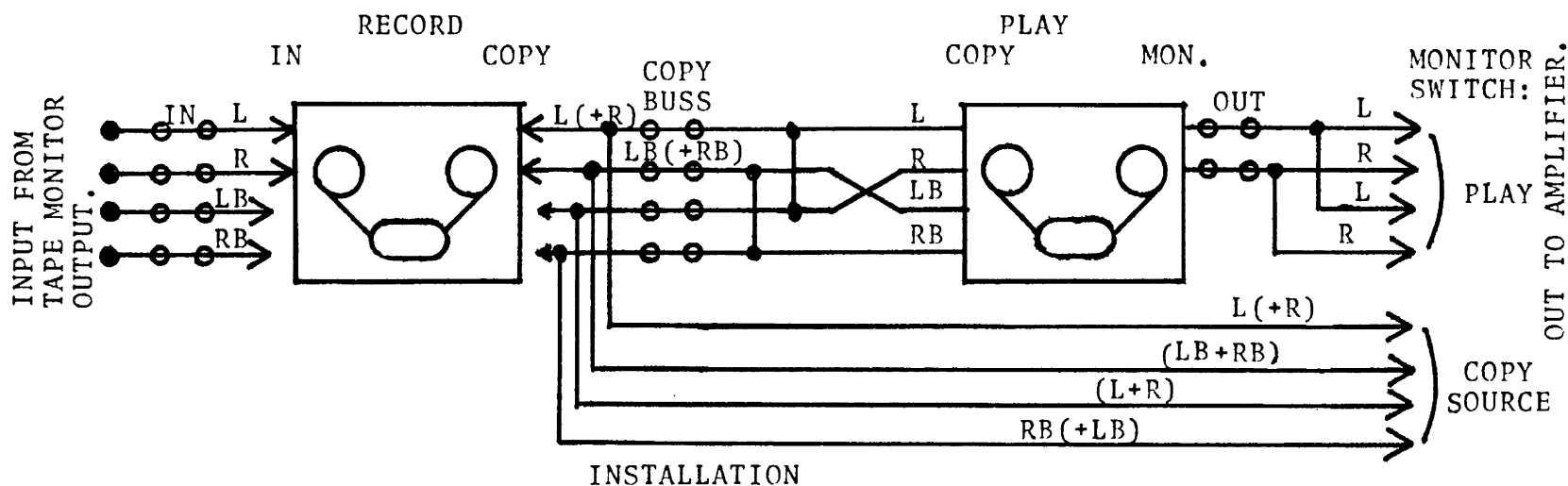
4 CHANNEL MODE, MIX SWITCH IN "N" (NORMAL) POSITION:
 RECORD (Recording tape machine.) PLAY (Playing or monitored machine.)



2 CHANNEL MODE, MIX SWITCH IN "N" (NORMAL) POSITION:



2 CHANNEL MODE, MIX SWITCH IN MONO (DOWN) POSITION:



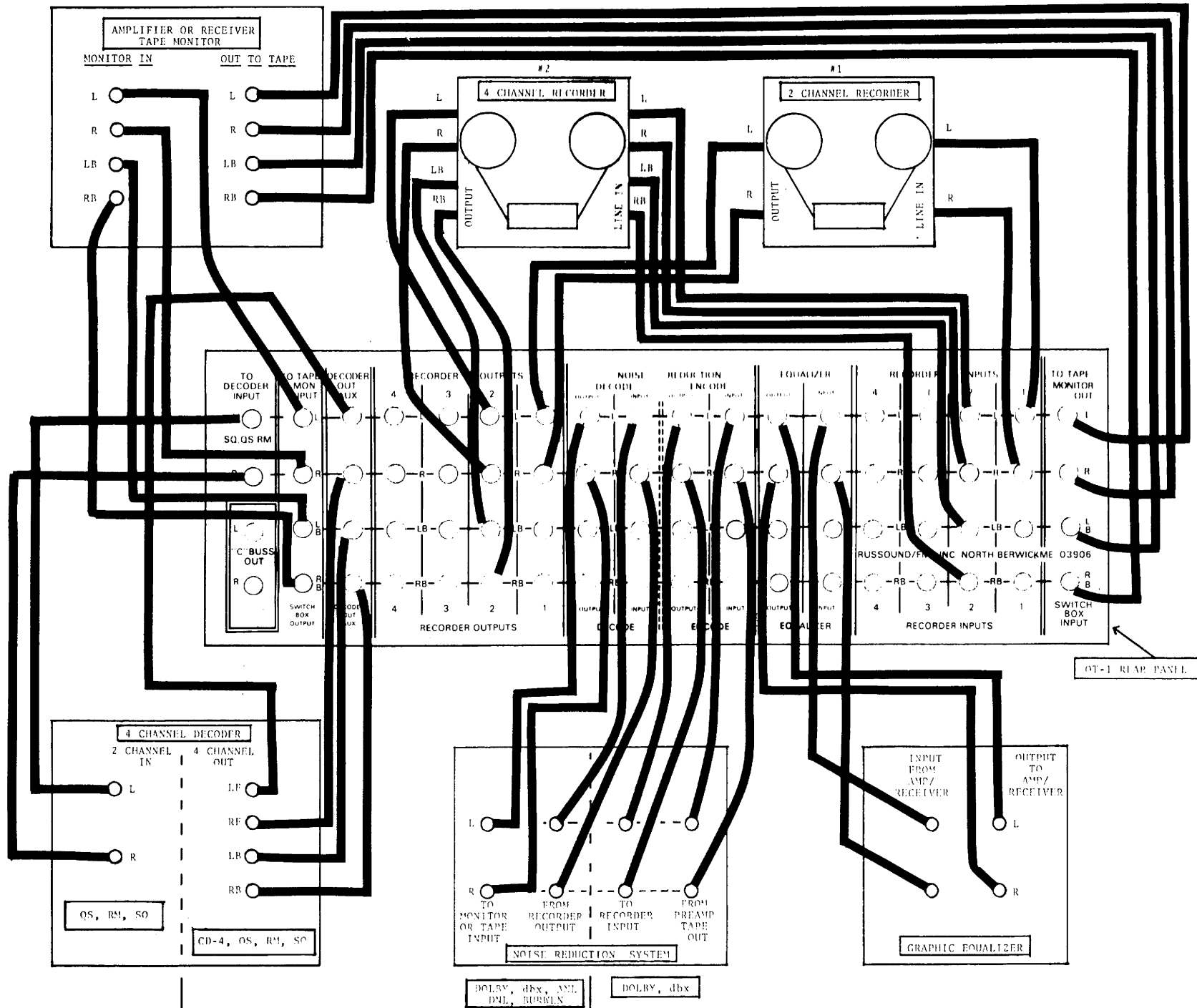
Connections to and from the QT-1 are identified on the back of the unit. The jacks marked "TO TAPE MON INPUT" are the switchbox output, and connect to the tape monitor input of your amplifier. RCA type phono (pin) plugs are used to all rear connections on the QT-1. Connections should be made as follows;

- LEFT: To left front of 4-channel, left of 2 channel stereo, or mono amplifier.
- RIGHT: To right front of 4-channel, right of 2 channel stereo (N.C. in mono).
- LEFT BACK: To left back of 4-channel system (N.C. in mono, stereo).
- RIGHT BACK: To right back of 4-channel system (N.C. in mono, stereo).

Connections are diagrammed on page 7.

The TO TAPE MONITOR OUT jacks are the switch box input, and connect to the Tape Monitor system in the same fashion as would the input of a single tape recorder.

- LEFT: From left front of 4-channel, left of 2 channel stereo, or mono amplifier.
- RIGHT: From right front of 4-channel, right of 2 channel stereo (N.C. in mono).
- LEFT BACK: From left back of 4-channel system (N.C. in mono, stereo).
- RIGHT BACK: From right back of 4-channel system (N.C. in mono, stereo).



RECORDER INPUTS: This set of jacks connects to the LINE (or AUX.) inputs of the tape recorders. The recorder selected to be #1 connects to the jacks under 1, #2 under 2, etc. The pattern of connection is the same as to the amplifier, ie;

LEFT: To left front of 4-channel, left of 2 channel, input of mono recorder.

RIGHT: To right front of 4-channel, right of 2 channel stereo.

LEFT BACK: To left back input of 4-channel recorder.

RIGHT BACK: To right back input of 4-channel recorder.

RECORDER OUTPUTS: Connections are as above. The recorder selected as #1 for input connections should also be #1 for output connections.

LEFT: From left front out of 4-channel, left of 2 channel, mono recorder.

RIGHT: From right front of 4-channel, right of 2 channel stereo.

LEFT BACK: From left back out of 4-channel recorder.

RIGHT BACK: From right back out of 4-channel recorder.

NOISE REDUCTION: The noise reduction system connects to this set of jacks, which are connected directly to the correspondingly marked phone jacks on the front panel. The QT-1 connects to the noise reduction device in the same manner as would a single tape recorder. The noise reducer connections normally made to the tape monitor system of the amplifier should go to the QT-1 instead.

Observe channel identity for the number of channels used.

ENCODE INPUT: Connects to the line input of the reduction device. This is the connection on the unit that would normally be connected to the preamp tape output.

ENCODE OUTPUT: Connects to the reduction device jacks normally connected to the tape recorder input.

DECODE INPUT: Connects to the reduction device jacks normally connected to the tape recorder output.

DECODE OUTPUT: Connects to the reduction device jacks normally connected to the amplifier tape monitor input.

NOTE: If the noise reduction unit is a non-encoding type (one which reduces apparent noise from any source, such as DNL or ANL), connection should be made to the DECODE INPUT and OUTPUT jacks on the QT-1 only.

EQUALIZER: Graphic equalizers, reverb units, or other audio accessories may be plugged in here. Connections are similar to those outlined above, the active inputs and outputs of the device connect to the QT-1. As before, keep channel identity in order, L to L, R to R, etc. Tape monitor connections (if any) for tape recorders should not be used.

EQUALIZER INPUT: Connect to the device terminals for: input from amplifier.
EQUALIZER OUTPUT: Connect to: output to amplifier terminals.

OTHER EQUIPMENT: The EQUALIZER and NOISE REDUCTION ENCODE - DECODE patching jacks are connected internally only to the pin jacks on the rear panel. Other types of accessories can be plugged into unused jacks, and the channels can be in any order desired. If connections are other than titled on the QT-1 panel, the existing nomenclature can be taped over and re-titled in ink or pencil. Adhesive backed mending tape is available in many stores in suitable colors.

DECODER OUT - AUX.: Output from any type of 4 channel decoder or demodulator can be connected to these jacks, observing channel identity. They also can be used as an auxiliary input from any audio source, mono to L only, 2 channel stereo to L and R, or any 4 channel source to the channels as identified. Audio fed to this QT-1 input is controlled by the DECODER OUT TO: switch on the front panel.

TO DECODER INPUT: Connect to the input of a matrix type of decoder (not CD-4) that normally would be connected to the tape monitor output of your amplifier. This input is controlled by the DECODE: switch.

INSTALLATION OF 2 DECODERS, MATRIX TYPE AND CD-4: Both decoders can be connected to the QT-1. If 3 or less tape recorders are used, one of the remaining TAPE RECORDER OUTPUTS sets of jacks on the QT-1 rear can be connected to the CD-4 demodulator output, and operated in the circuit in the same manner as a recorder output. Output from the CD-4 demodulator can then be played by operating the appropriate QT-1 OUT switch to the MONITOR position, or recorded when in the COPY position.

If all inputs are used, the extra decoder can be accommodated by connecting miniature phone plugs to its outputs, and plugging them in the OUT - MONITOR jacks for listening, or the COPY BUSS - RECORDERS jacks for recording. If connected in this manner, these plugs must be disconnected from the QT-1 when the demodulator is not in operation.

"C" BUSS OUT: These 2 jacks are connected to the L and R channels of the internal COPY BUSS of the QT-1, and are used primarily for large scale duplicating set-ups, where more QT-1s may be paralleled for 2 channel duplication. The same audio signal that appears at the L and R COPY BUSS - RECORDERS phone jacks on the front panel is available at these terminals.

CUSTOM INSTALLATION: The QT-1 may be used free standing in its cabinet, or it can be secured to the surface where located for greater stability when inserting and pulling patch cords. The unit is held in its cabinet by six #4 wood screws in the front panel, and two #6 sheet metal screws in the bottom. To secure to the mounting shelf, remove the two bottom screws. Drill 2 holes in the mounting surface approximately 5/32" diameter, spaced the same as the 2 holes in the QT-1 cabinet bottom. Secure with #6 sheet metal screws of an approximate length equal to the original plus the thickness of the mounting surface. Add the thickness of the feet, if not removed.

PANEL MOUNTING: Remove the 6 panel screws and the 2 bottom screws and slide the QT-1 out of the cabinet toward the front. Use #4 wood screws or 4-40 machine screws and nuts to secure in the custom panel through a cut out 13 1/16" wide X 4 1/8" high. The QT-1 can be supported entirely by the panel, it is made of heavy gauge steel for this purpose.

OPERATION

AMPLIFIER CONTROLS: The QT-1 is passive, and does not replace the controls of the amplifiers used. It expands the usefulness of the tape monitor system without overriding any of the normal functions.

4 - CHANNEL AMPLIFIERS: When connected to the tape monitor jacks of a 4 - channel receiver or preamplifier, all volume and balance functions will be the same as for routine operation. To place the QT-1 and associated equipment in operation, switch the tape monitor system of the amplifier "ON", with the mode selector in the 4-channel position.

2 - CHANNEL AMPLIFIERS: Stereo operation is same as above, the mode switch should be in the STEREO position, and the QT-1 mode switch in 2 Channel.

2 - 2 CHANNEL AMPLIFIERS USED FOR 4 CHANNELS: Operation will be similar to that listed under 4-CHANNEL AMPLIFIERS, except that volume and balance operations will be separate, the FRONT volume and balance will be controlled at one amplifier, the REAR at the other. Both amplifiers should be set for STEREO operation.

QT-1 SWITCHES AND JACKS: The QT-1 panel switches and jacks are layed out in the order of audio flow in the switchbox. Inputs from the amplifier tape monitor are connected directly to the front panel jacks IN - SOURCE, the arrows show the direction of audio feed to the RECORD switches. In like fashion, audio routing from the PLAY switches to the MONITOR switch and amplifier, or the COPY BUSS, is shown.

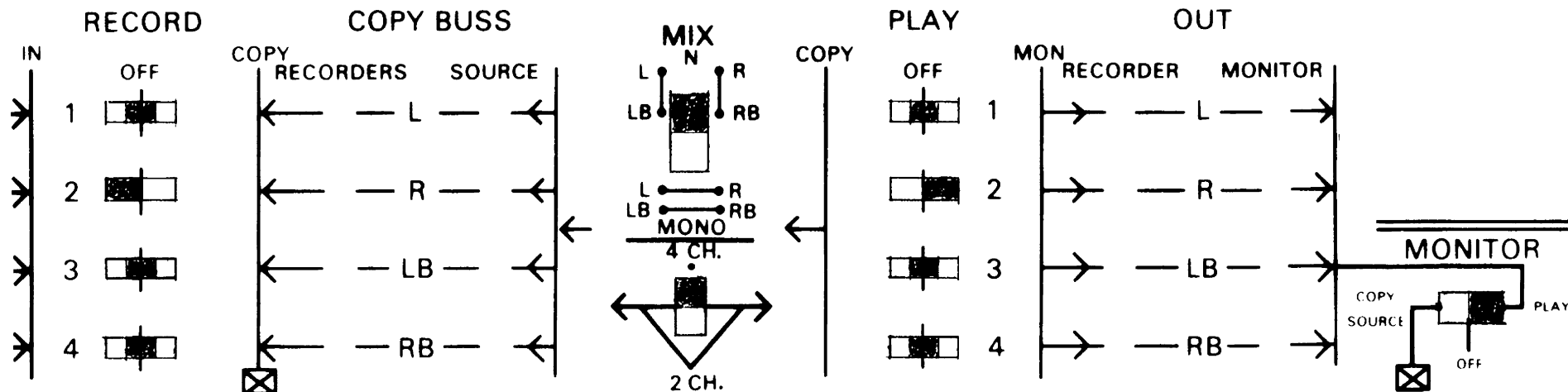
The leftmost row of switches, under RECORD on the front panel, control the inputs of the recorders connected to the corresponding numbered jacks in the back of the QT-1. The row of switches under PLAY provide selection of the recorder outputs. (It is good practice to place all RECORD and PLAY switches in the OFF position when not using your tape recorders, switching in the desired machines at the time of use. This will eliminate unnecessary checking if abnormal operation occurs.)

PLAY AND MIX OUTPUTS

To play any recorder, switch in the monitor system of your amplifier, and operate the PLAY switch for the desired recorder to the MON (monitor) position. The QT-1 MONITOR switch must be in the PLAY position. Operate the tape recorder in its normal mode to play tapes. Outputs from more than one tape recorder can be played simultaneously, if desired, by placing the associated PLAY switches in the MON position at the same time. 3.3 K ohm resistors are used in the output circuit for each tape recorder for this purpose, allowing mixing without overloading the recorder outputs. NOTE: A loss of output, about 6 db, will be encountered when operating more than one machine because of the mixing network insertion loss. The 4 CH - 2 CH switch should be in the 4 CH position for quadraphonic tapes, and in the 2 CH position for stereo.

RECORDING

Normal recording from all the sources associated with the tape monitor system, such as phono, FM, and AM, is achieved by operating the appropriate RECORD switch to the IN (leftmost) position. One, two, three or all four machines may be operated at the same time, keeping in mind the fact that the combined loading may reduce the tape monitor output somewhat, depending on the input impedance of the recorders, and the output impedance of the source. The 4 CH - 2 CH switch does not affect the IN buss.



RECORD AND MONITOR 4 CHANNELS ON MACHINE #2.

Making copies of tapes from one machine to one or more others, mixing two machines to others, and simple editing by selective copying are accomplished using the internal COPY BUSS system, marked thus on the QT-1 panel. "RECORD" AND "PLAY" SWITCHES PLACED IN THE "COPY" POSITION WILL CONNECT THOSE RECORDER INPUTS AND OUTPUTS TOGETHER. The manner of connection is determined by the positions of the MIX and 4 CH - 2 CH switches. The output of any recorder connected to the COPY BUSS can be recorded on any machine with its input also switched to the COPY position. Because of the previously described mixing networks, any combination of recorders is possible, one to one, one to several, two to one or more, etc. DO NOT place the RECORD and PLAY switches of the same recorder in the COPY position at the same time, for the machine might oscillate, adversely affecting the recording in progress. The QT-1 RECORD switch for the source recorder should usually be in the OFF position to avoid this situation, or inadvertant recording of unwanted material from the monitor output of your amplifier. If possible, turn the record level controls down on the source machine to avoid noise pickup.

OPERATION OF THE MIX AND 2 CH - 4 CH SWITCHES IN DUBBING.

4 CHANNEL DUBBING: Reference to the front pages of this manual and inspection of the circuit block diagrams may be helpful. When dubbing 4 channel tapes to other 4 channel recorders, the 2 CH - 4 CH (mode) switch must be placed in the 4 CH position, and the MIX switch in the "N" (normal) position.

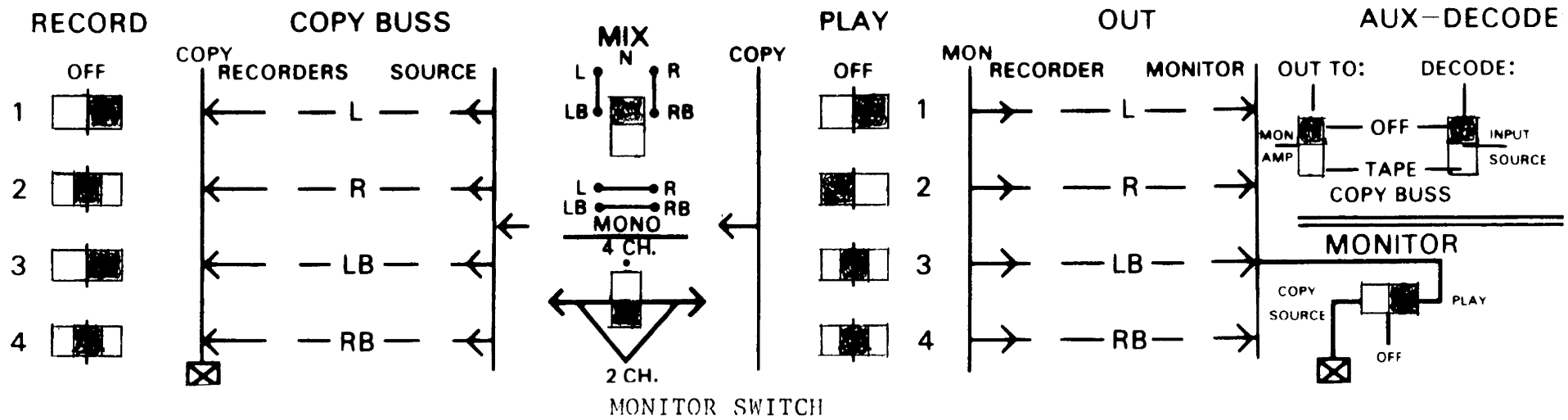
STEREO DUBBING: Dubbing of 2 channel stereo tapes may be done with the switches placed as above, or with the mode switch at 2 CH. Operation in the 2 CH position permits monitoring of the recording on all 4 amplifier channels if dubbing stereo in a 4 channel system. The L and R channels only will be monitored if the switch is in 4 CH.

MONO DUBBING: The positions of the MIX and 2 CH - 4 CH mode switches will not affect mono recorders connected to the L channel.

MIXDOWN: 4 TO 2 CHANNEL: Place the mode switch in the 2 CH position, this will connect the 4 channel recorder outputs together in pairs. The internal isolating resistors will prevent overloading the tape recorder outputs, but will introduce about a 6 db drop in level due to mixing network insertion loss. The manner of mix is determined by the setting of the MIX switch. In the up ("N") position, the Left front and Left back are mixed together to the L channel of the copying recorder, and the Right front and Right back are mixed to the R channel. Operation of the MIX switch to the down (MONO) position will combine the L and R front channels to the L input of the copying recorder, and the LB and RB back channels to the R channel. An example is illustrated on the facing page.

MIXDOWN; STEREO TO MONO: The mode switch should be in the 2 CH position and the MIX switch in MONO (down). The L and R channels are then mixed to the L channel of the QT-1, and to the input of the mono recorder. A 6 db mixing loss will be evident due to the mixing network. There will be no output on the Right channel monitor when dubbing stereo to mono.

MIXDOWN--4 TO 2 CHANNEL, OR DUBBING 2 CHANNEL TAPES. (COPY OUTPUT OF RECORDER # 2 ON RECORDERS # 1 AND 3, MONITOR # 1.)



The monitor switch is marked "PLAY", "OFF", and "COPY SOURCE". In the COPY SOURCE position the monitor amplifier is connected to the internal COPY BUSS at the point designated "X" on the QT-1 panel. This permits the machine used for dubbing to be monitored at the input. In effect, the output of the source recorder is monitored after mixing, equalizing, etc. "PLAY" is the normal mode of operation, connecting the monitor amplifier to the output or "MON" line from the recorders. The MONITOR switch must be in the "PLAY" position in order to play recorders switched to the "MON" output.

Convenient cueing is possible because the COPY BUSS can be directly monitored with the MONITOR switch in the "COPY SOURCE" position. It is not advisable to operate the MONITOR switch during recording without first making test recordings and operating the switch rapidly back and forth to determine whether any recording level changes or switching clicks occur. In some circumstances it is possible that a substantial loading difference may be introduced, causing a change in level from the source recorder. This effect would be caused by a low impedance input to the monitor amplifier system. Level changes caused by this situation can be eliminated using Russound/FMP Inc. Impedaversers or their equivalent in the QT-1 output. These devices will isolate load variation effects.

4 CHANNEL DECODER OPERATION

DECODE: SWITCH: The DECODE switch determines the source for decoding when used with QS, RM or SQ matrix type decoders. When in the INPUT SOURCE position, material from the tape monitor output, such as phono or FM, will be decoded. In the TAPE COPY BUSS position, any 2 channel tape recorder switched to the PLAY - COPY position will be decoded. The INPUT SOURCE position is decoded after the audio is passed through the IN set of patching jacks, so that Dolby noise encoded broadcasts may be decoded, or equalization inserted before decoding the program. Switch to "OFF" when not in use to avoid unnecessary loading of the source.

DECODER - OUT TO: This switch operates similarly to the tape OUT switches. The 4 channel decoder will be connected to the monitor amplifier for listening when in the MON AMP position. The OUT set of patching jacks may be used for insertion of equalization, reverberation, etc. The TAPE COPY BUSS position connects the decoder output to the COPY BUSS so that 4 channel recordings can be made. 2 channel tapes can be decoded to 4 channel (real or synthetic) and recorded in 4 channel when both DECODER switches are in the TAPE COPY BUSS position. NOTE: Since the output of the 4 channel decoder will always be in 4 channels, the 4 CH - 2 CH switch must be in the 4 CH position when the decoder is used. SWITCH TO "OFF" WHEN NOT IN USE TO AVOID ATTENUATION OF TAPE RECORDER OUTPUTS.

CD-4 DEMODULATORS: The DECODER - OUT TO: switch will direct the output of a CD-4 demodulator in the same manner as above, if this type is connected to the QT-1 decoder jacks in the back. Depending on the demodulator, some will automatically switch from 4 to 2 channel in the absence of the encoding high frequency carrier, others may require manual switching. Most will automatically strap the front and back channels to the stereo Left and Right, making any switching on the QT-1 unnecessary. If this is not the case, and the back channels are dropped in stereo, feed to all 4 channels can still be maintained by operating the QT-1 mode switch to the 2 CH position.

If both CD-4 and matrix decoders are connected to the system, operation of the CD-4 decoder will be as described under "INSTALLATION OF 2 DECODERS:."

USING THE PATCH CORD SYSTEM.

The signal paths through the QT-1 switchbox are designated by the arrows on the front panel. Each channel of the "IN", "COPY BUSS", and "OUT" switching system passes through a pair of jacks on the panel. These jacks are a switching type, so that the "through" circuit is disconnected when a plug is inserted, and the signal transferred to the patch cord.

Following the direction of the panel arrows, the jack that the arrow points toward is the source side of the circuit, a cord plugged in at this point will disconnect the internal circuit, and the plug tip will have this source signal on it.

The jack that the arrow points away from is the fed side of the circuit, (ie. tape recorder or monitor amplifier inputs). A patch cord plugged in at this point will disconnect the internal circuit, and the plug will feed any audio applied to it to the indicated recorder or amplifier channel.

NOTE: THE MONITOR GAIN SHOULD BE TURNED DOWN WHEN PATCHING TO AVOID THE POSSIBILITY OF LOUD CLICKS OR HUM CAUSED BY INADVERTANT TOUCHING OR SHORTING OF THE PLUG TIP WHEN "HOT".

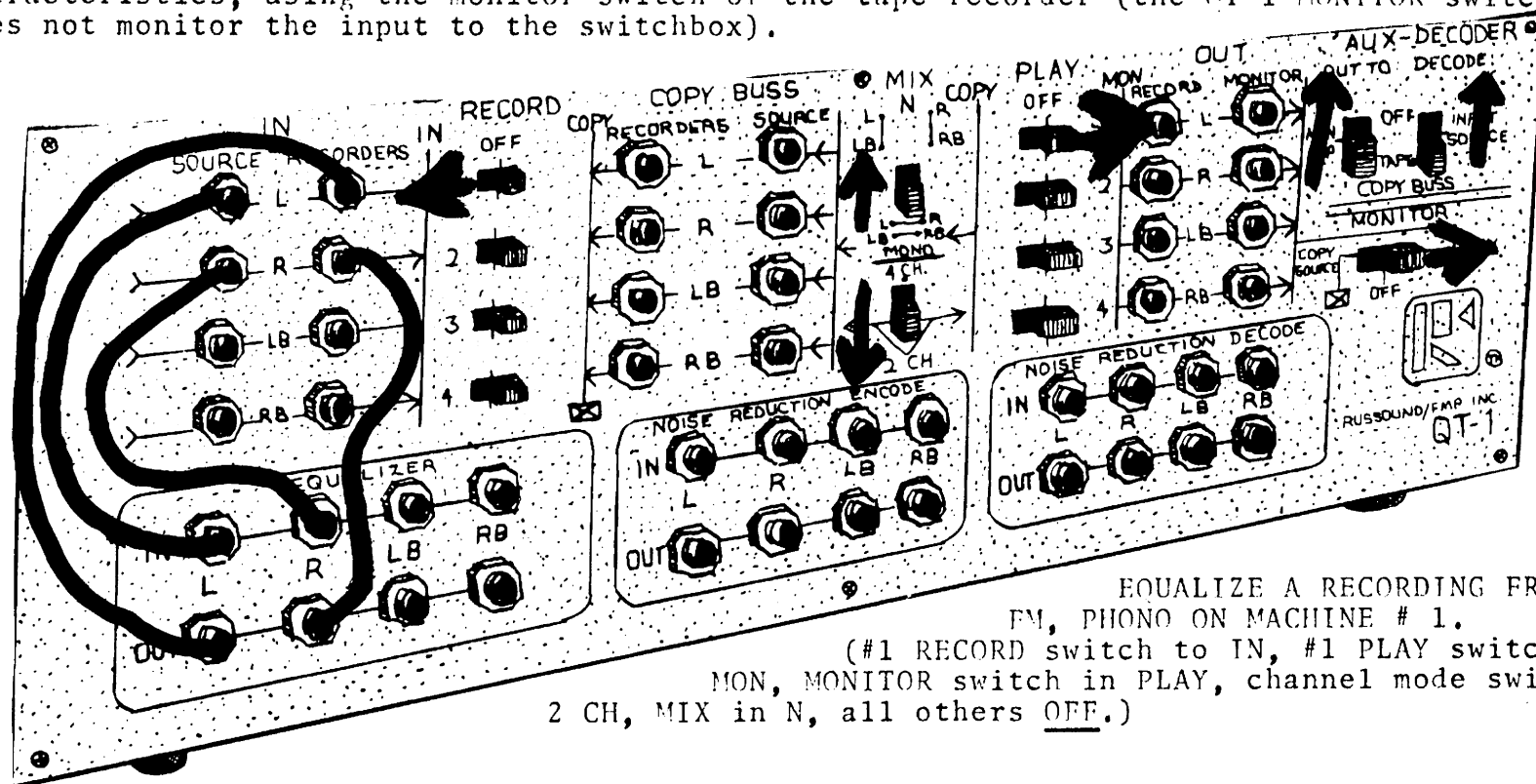
Patch cords are usually used in pairs, one for a signal output and the other for input. The cord with audio signal on it can be plugged into the input of any external device for such purposes as noise reduction, equalization, etc., and the output of the device returned to the switchbox circuit through the cord feeding the input of the involved recorders or amplifier.

EQUALIZER, NOISE REDUCTION ENCODE, and NOISE REDUCTION DECODE: These jacks connect directly to correspondingly marked RCA type pin jacks on the rear panel. The switching function of these jacks is not used. There are no connections between these jacks and

the switchbox circuitry above them, any connection to accessory devices associated with these jacks must be made through the patch cord system. This permits the audio signal to be processed in any desired manner and sequence to any point in the circuit.

Due to the wide range of possible hook-ups, it is not practical to attempt to describe other than the most basic ones. An understanding of the logic of patching and the QT-1 circuit will be most helpful toward gaining full utilization of the QT-1. A few hook-ups are described below and illustrated to facilitate familiarity with the system. Blank prints of the front panel are supplied so that frequently used complex patching set-ups can be marked on them for reference.

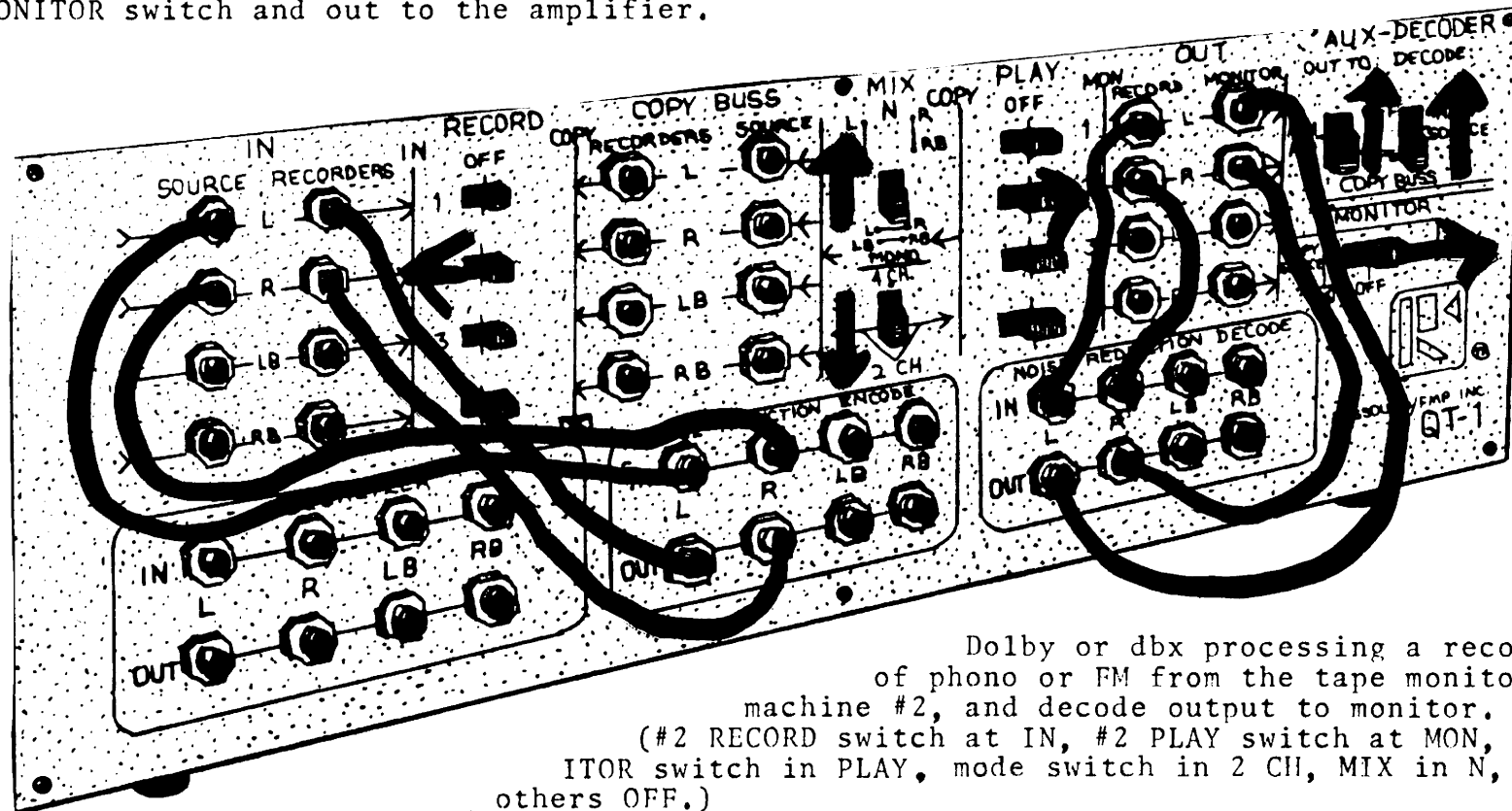
EQUALIZE A TAPE RECORDING FROM A PHONOGRAPH RECORD, FM, OR AM: Operate the RECORD selector switch for the desired recorder to the IN position, and the PLAY switch to MON for monitoring purposes. Connections are made according to the number of channels involved. Assuming 2 channel stereo, the mode switch should be in the 2 CH position so that the output will be connected to all 4 amplifiers if a 4 channel system. Connect a patch cord from the IN - SOURCE jack L channel to the EQUALIZER IN L jack. Connect a second cord from the EQUALIZER L OUT jack to the L RECORDERS jack under IN. The equalizer is now connected to the left channel input of the tape recorder. Repeat the same sequence for the right channel to complete the connections. Adjust the equalizer for the desired sound characteristics, using the monitor switch of the tape recorder (the QT-1 MONITOR switch does not monitor the input to the switchbox).



**EQUALIZE A RECORDING FROM
FM, PHONO ON MACHINE # 1.**
(#1 RECORD switch to IN, #1 PLAY switch to
MON, MONITOR switch in PLAY, channel mode switch in
2 CH, MIX in N, all others OFF.)

USE OF NOISE REDUCTION SYSTEMS WHEN RECORDING PHONOGRAPH RECORDS, FM OR OTHER OUTPUTS FROM THE TAPE MONITOR SYSTEM: NOTE: Before using a noise reduction system, observe the calibrating instructions furnished by the manufacturer of the device. The NOISE REDUCTION ENCODE jacks connect to the SOURCE and RECORDERS jacks under IN in exactly the same fashion as the equalizer just described.

A noise reduction treated tape must be decoded in order to monitor with properly balanced sound. Therefore, the decode system should be inserted between the tape recorder output and the monitor amplifier. This is accomplished using the jacks under OUT and NOISE REDUCTION DECODE. Observing channel identification, a cord should be plugged from the OUT - RECORDER jack to the NOISE REDUCTION DECODE - IN jack, and from the NOISE REDUCTION DECODE - OUT jack to the OUT - MONITOR for each channel. Audio is now routed from the recorder output to the noise reduction decoding input, and the decoded sound back to the MONITOR switch and out to the amplifier.



Dolby or dbx processing a recording of phono or FM from the tape monitor on machine #2, and decode output to monitor. (#2 RECORD switch at IN, #2 PLAY switch at MON, MONITOR switch in PLAY, mode switch in 2 CH, MIX in N, all others OFF.)

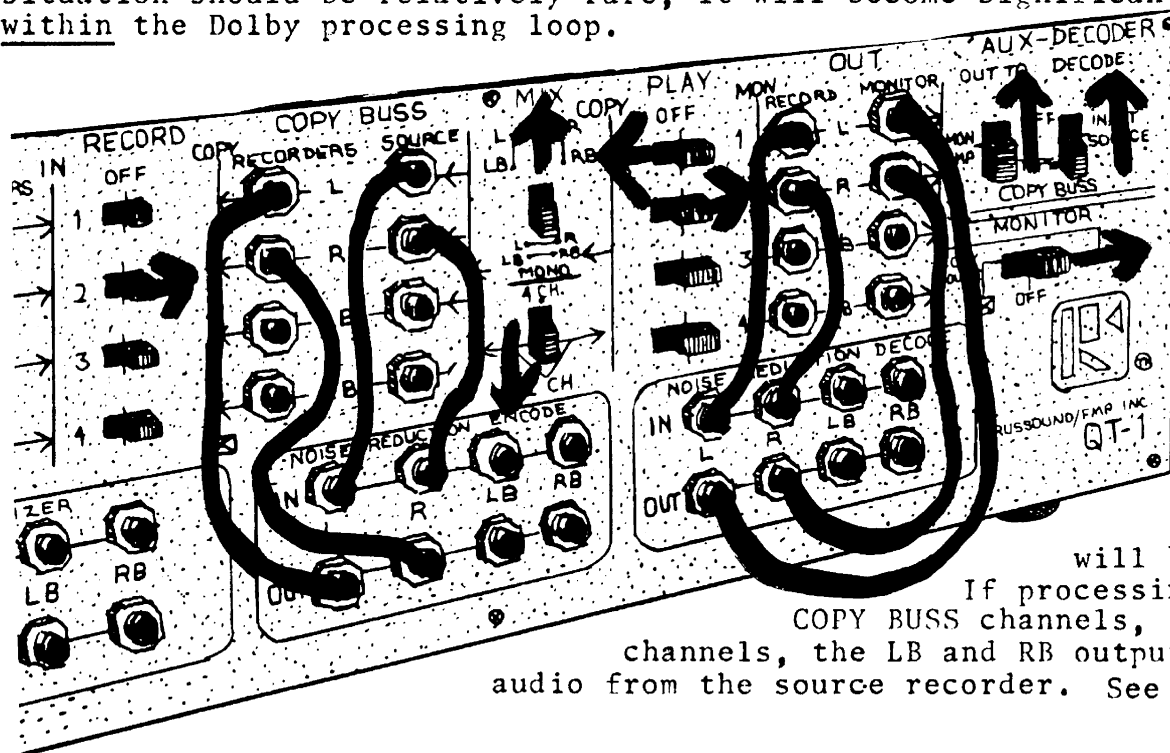
The encoded audio will track for proper Dolby decoding only if the recorder monitor and output level are identical when comparing input-output quality using the recorder's monitor switch. A change of sound balance will indicate that adjustment is needed, or a check of recording quality should be made without noise reduction processing.

DUBBING TAPES USING NOISE REDUCTION: There are several situations that may be accommodated. Dolby or dbx encoded tapes may be copied on other recorders without decoding and re-encoding as long as the involved recorders are properly calibrated. In this case, nothing should be inserted in the COPY BUSS, but the noise reduction decoder should be inserted in the OUT sets of jacks so that the recording machines can be monitored properly.

Noise reduction can be applied to copying recorders by insertion of the NOISE REDUCTION ENCODE in the COPY BUSS as follows; COPY BUSS - SOURCE to NOISE REDUCTION ENCODE - IN, and NOISE REDUCTION ENCODE - OUT to COPY BUSS - RECORDERS, observing channel identification. NOISE REDUCTION DECODE connects to the OUT set of jacks as before for proper monitoring.

When connected in the above manner, the MONITOR switch will select an encoded signal when in the COPY BUSS position, and a decoded signal in PLAY. The sound monitored from the COPY BUSS will be altered in response or dynamic range. A direct input-output comparison including the noise reduction system can be made by using the monitor switch of the subject recorder (with levels balanced for tracking), with the QT-1 MONITOR switch in the PLAY position. If necessary to use the QT-1 MONITOR switch, it is suggested that the decoder not be patched into the OUT bay, so that the in and out sound quality can be directly compared.

If outputs of 2 or more recorders are mixed for recording on another machine through Dolby processing, the 6db or greater insertion loss of the mixing network must be kept in mind, and, if necessary, allowances made in calibration to assure proper tracking. This situation should be relatively rare, it will become significant only if the mixing is done within the Dolby processing loop.



COPY MACHINE #1 ON #2, NOISE ENCODE #2 IN STEREO. (#2 RECORD switch to COPY, #1 PLAY switch in COPY, #2 PLAY switch in MON, mode switch in 2 CH., MIX in N, MONITOR switch at PLAY, all others OFF.)

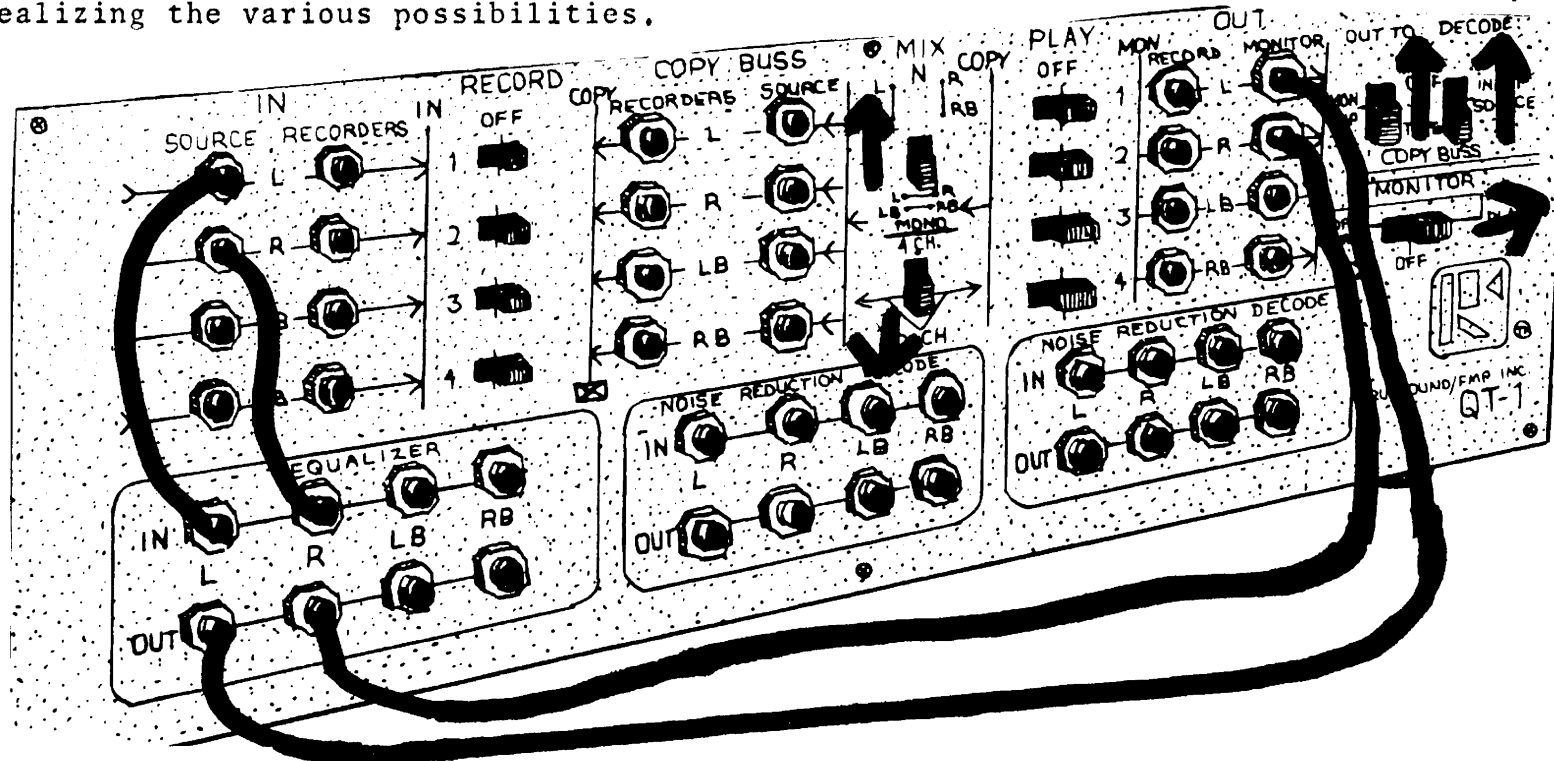
NOTE: The 2-4 channel mode switching is done before the COPY BUSS patch panel. When the MONITOR SWITCH is in the COPY BUSS position, whatever is connected into each channel

will be monitored from that channel. If processing is inserted in the L and R COPY BUSS channels, it will be heard only in these channels, the LB and RB outputs will still contain unprocessed audio from the source recorder. See the block diagrams.

Equalizers, noise reducers, etc. may be connected in series. As an example, if it is desired to equalize a recording before making a copy, and the copy is to be noise processed, the source signal can be routed to the EQUALIZER IN, the EQUALIZER - OUT to the NOISE REDUCTION ENCODE - IN, and the NOISE REDUCTION ENCODE - OUT to the recorder inputs. EQUALIZERS, REVERBERATION, OR OTHER NON-LINEAR DEVICES MUST NOT BE INSERTED IN THE NOISE REDUCTION LOOP BETWEEN ENCODE, THE TAPE RECORDER, AND DECODE! This will cause mistracking of the noise reduction system, with unsatisfactory results.

USING THE QT-1 FOR EQUALIZATION, NOISE REDUCTION, AND SWITCHING FOR THE AMPLIFIER: The QT-1 is useful in operations not involving tape recorders. It can be used to switch in your equalizer or noise reduction system directly to the tape monitor system of the amplifier for room acoustic compensation, decoding of Dolby FM broadcasts, feeding 4 amplifier channels from stereo sources, crossing channels in any desired manner, etc.

Audio from the tape monitor is connected directly to the IN - SOURCE jacks on the QT-1 panel. The OUT - MONITOR panel jacks connect to the tape monitor input of the amplifier through the MONITOR switch. Therefore, any device connected between these points is in effect inserted into the tape monitor system of your amplifier. As an example, a graphic equalizer could be inserted by patching from the IN - SOURCE jack to the EQUALIZER - IN jack, and from the EQUALIZER - OUT jack to the OUT - MONITOR jack, with due regard to channel identification. A 2 - channel equalizer can be used to feed 4 amplifier channels by operating the 4 CH-2CH switch to 2 CH to strap the amplifiers together. Reference to the block diagrams in the earlier portion of this manual will be helpful in realizing the various possibilities.



The 4-channel DECODE: switch is internally connected to the IN - RECORDERS L & R jacks, no patching is necessary unless desired. Otherwise, any function where feed through the QT-1 is desired will require patching or use of a tape recorder, there are NO direct through connections.

Dolby processed FM broadcasts can be accommodated utilizing your Dolby unit connected to the QT-1, patching the Dolby NOISE REDUCTION DECODE between the IN - SOURCE and OUT - MONITOR jacks as above (or into IN - RECORDERS if you wish to record). The FM tuner used must have the proper 25 microsecond de-emphasis modification and be properly calibrated before this can be done. Noise encoded records can be handled in the same fashion.

Channel swapping, strapping, etc., can be done with or without equalizers, noise reducers, etc. A patch cord between the IN - SOURCE and OUT - MONITOR jacks will run the tape monitor system audio through the monitor switch of the QT-1, and allow 4 channel or strapped feed of 2 channels to be monitored through a 4 channel amplifier using the 4 CH-2 CH mode switch. Swapping of channels in any desired order may be accomplished by patching the L input cord to another channel at the output, the R into another out, etc. A-B comparisons of different channel arrangements can be made by using the QT-1 to cross channels to a new combination, and switching the amplifier tape monitor switch in and out.

These operational descriptions are only a few of the many possibilities that can be explored. Many others will become apparent as you become accustomed to using the QT-1.

SPECIAL WIRING

In cases where a specific mode of operation is used almost constantly, it is possible to connect the QT-1 in a manner so that it is not necessary to permanently install external patch cords. The internal circuit board, and the accessory jacks in the bottom rows on the panel are arranged so that any set-up can be wired internally with the panel clear of cords, yet with the possibility of patching up variations. ALTHOUGH PROVISIONS HAVE BEEN MADE FOR MODIFICATION, RUSSOUND/FMP INC. MUST LEAVE THE RESPONSIBILITY FOR THE WIRING ROUTING AND FUNCTION UP TO THE USER. There are too many possible variations to suggest specific approaches. RUSSOUND/FMP INC. CANNOT ASSUME RESPONSIBILITY FOR THE DESIGN OR FUNCTION OF ANY MODIFICATIONS TO THE EXISTING CIRCUIT.

All of the accessory jacks (those not on the PC board) are of the switching variety, but the switching portions of the jacks are not wired in the production model. The grounds are wired through the two ground terminals of the jacks, and the tip connections (the hollow wire loop) connected to the pin jacks on the rear panel. The remaining, not used, lug on each jack is the switched through connection.

The main portion of internal QT-1 wiring is on a 2-sided printed circuit board. This board may be inspected by removing the QT-1 from the wood cabinet, and the metal cover from the chassis. The cover is held by #6 sheet metal screws in both sides. DO NOT ATTEMPT TO REMOVE THE CIRCUIT BOARD ASSEMBLY, OR TO SOLDER DIRECTLY TO THE BOARD--THIS WILL VOID YOUR WARRANTY.

On the PC board rear the numbers J-1 through J-12 appear adjacent to wire jumpers. J-1 through J-4 are jumpers between the SOURCE and RECORDERS jacks at the IN circuit; J-1 is Left, J-2 is Right, J-3 is Left Back, and J-4 is Right Back. The location of these jumpers is shown on the schematic.

Jumpers J-5 through J-8 are between the OUT - RECORDER and MONITOR jacks, with J-5 being Left, etc. Jumpers J-9 through J-12 are between the COPY BUSS - SOURCE and RECORDERS jacks, J-9 is Left, etc.

To use the jumpers, cut the wire at the center with diagonal cutters, and form a hook on each free end. Wires can then be soldered to the hook. DO NOT SOLDER DIRECTLY TO THE PC BOARD! Direct connections between the desired accessory panel jack terminal and the appropriate jumper point in the circuit can route any sequence internally. Variations can be accomplished by patching them up on the front panel.

Make sure that the ground lug is between the cover and chassis when replacing the cover, this connection is important to maintain complete shielding.

PROBLEMS?

The QT-1 is a passive switch box, and is basically a substitute for a single tape recorder in the tape monitor system of the amplifier. Since no active units are in the switchbox, any problems will probably be associated with proper connections, control settings on the recorders and accessories involved, and the connectors themselves. The nature of the QT-1 circuit must be kept in mind, too, it does not switch straight through the monitor system, any audio through the QT-1 must feed through a tape recorder, 4-channel decoder, accessory, or patch cord. Patching in improper sequence, wrong settings of controls or switches can disable the entire system. A review of the block diagrams and schematics of the QT-1 may be helpful toward "logicking" out the solution. Some approaches to checking the system out follow.

SYSTEM INOPERATIVE WHEN QT-1 IS SWITCHED IN:

- (A) Recheck all connections between the QT-1 and the recorders, decoder, and accessories, and especially the tape monitor jacks of the amplifier. Make sure that the output from the amplifier tape monitor is connected to the QT-1 input, and the QT-1 output to the amplifier tape monitor input.
- (B) Check the connector cables, especially those involved with any single channel that may be inoperative.
- (C) Check for proper control settings on both the QT-1 and the equipment involved. For example, failure of a recorder to play might be traced to the recorders' monitor switch in the 'input' position. The proper recorder PLAY switch must be in the MON position, and the MONITOR switch in PLAY.

Problems involving the EQUALIZER or NOISE REDUCTION systems may result from controls for these units being set wrong for the manner of connection to the QT-1. If an equalizer is connected according to the diagrams in this manual, the tape monitor system of the equalizer (if any) will not be operative, and positioning of the equal-

izer function switch in the tape monitor position will disable it.

- (D) Proper patch cord plugs are essential, use cords available from Russound or Switchcraft type 770 or 780 shielded "Tini-Plugs" with low capacity shielded cable, or an exact equivalent. Some inexpensive plugs do not mate properly with the switching type jacks used in the QT-1.

GENERAL: Problems arising with involved patch-ups might be easier to trace out by returning to the basic set-up and then patching in additional circuitry items one at a time. This procedure will help isolate possible channel reverses, wrong connections, or input and output reverses.

DEAD REAR CHANNELS of a 4 channel system when playing 2 channel material will probably be caused by improper positioning of the 2 CH-4 CH mode switch. Lack of 4 channel sound dimensioning might be traced to this switch in the 2 CH position.

A DEAD RIGHT CHANNEL when playing stereo through the COPY BUSS will occur when the MIX switch is in the MONO (down) position- this mixes the L & R signals to the "L" buss only, with 2 channel material.

LOSS OF OUTPUT from a recorder can be caused by leaving other recorder PLAY switches in the same position, or by leaving the DECODER - OUT TO: switch on. This brings the mixing networks into play. All unused equipment should always be switched off or unpatched from the circuit.

SIGNAL TRACING: The SOURCE jacks under IN are connected directly to the tape monitor output of the amplifier, and can be used as an audio source for signal injection when problems arise. Feed FM or a phono record to the tape monitor, and plug a patch cord in the L SOURCE jack. This signal can now be injected at any desired point in the circuit. Input points that can be checked are; IN - RECORDERS, COPY BUSS - RECORDERS, OUT - MONITOR, and the IN jacks for the EQUALIZER and NOISE REDUCTION systems. Restoration of signal at any point will isolate the trouble source.

Foreign material might cause one of the through switching jacks to fail to close when a patch cord is removed, thus opening the circuit. This can be checked by patching through the involved jacks. As an example, if left channel feed from the amplifier tape monitor out is lost before reaching a tape recorder input, a patch cord inserted in the Left channel IN - SOURCE and IN - RECORDERS jacks will show if proper connection is being made--a restoration of audio will indicate faulty action of the jack switching contacts.

INTERMITTENT JACK contacts can usually be cleared by inserting and removing a plug several times. If this action does not clear a known faulty connection, proper action can usually be restored by loosening the nut holding the involved jack on the front panel (observing care to avoid scratches) and inserting the plug several times. Retighten with the plug in place. A de-oxidizing contact cleaner sprayed into the hole usually is helpful.

INTERMITTENT SWITCH action can be cleared by rapid motion through the positions several times. Double wipe action silver plated contacts are used throughout, the wiping action will clean the contacts quickly.

HUM: Introduction of hum into the system when the QT-1 is switched in may be traced to several possible causes;

- (A) Poor grounding between the QT-1 and the monitor amplifier- inspect the interconnecting cables for good ground connections.
- (B) Hum from one of the recorders or accessories plugged into the QT-1. Test by removing power from the accessories one at a time to isolate the source. Disconnect the interconnecting cables from each recorder, accessory, one at a time. If an accessory is found to be the cause of the hum, check grounding, and if possible try reversing its power plug in the wall socket. Look for a defect in the unit that causes hum.
- (C) Ground loops in the system can cause 60 or 120 Hz hum. This type of hum may or may not be effected by the amplifier volume controls. The cause is usually ground connections between the amplifiers at more than one point. All amplifiers will be grounded together at their tape monitor system (or between preamp and power amp) when the QT-1 is installed. There should be no other point in the installation with the grounds tied together externally, such as phonograph cartridges, tape head inputs, or at the speaker connections. This is especially true in systems incorporating 2 separate stereo amplifiers of different design, and amplifiers employing variable damping or other circuitry where the speaker connections do not return directly to chassis ground.
- (D) Cables should not be plugged into the back or front of the QT-1 with ends hanging free. Patch cords should always be connected at both ends. The QT-1 is fully shielded, but a free hanging cable can introduce hum inside the box, affecting everything connected to it.

STRAY SIGNAL PICKUP: Unwanted sound from radio stations, amateur or CB radio operators, and remote controlled traffic systems can be introduced through poor or improper grounding of any of the cables connected to the amplifier or QT-1. Make sure there are no broken connections between any of the cables and the grounding portion of the associated plugs. Inspect all connectors to be sure that they are clean and bright, a corroded connection can act as a diode detector for radio frequencies. In severe cases, the situation may be helped by strapping the QT-1 to the amplifier chassis ground with heavy wire and connecting the entire system to an earth ground.

WARRANTY

The Russound/FMP Inc. QT-1 switchbox is fully guaranteed for 6 months from date of purchase against all defects in materials and workmanship. During this period Russound/FMP, Inc. will replace any defective part and correct any defect in workmanship without charge for either parts or for labor.

For this warranty to apply, the unit must be installed and used according to its written instructions. If servicing is necessary, it must be performed by Russound/FMP, Inc. or a factory authorized agency. The unit must be returned to Russound/FMP, Inc. at the owners' expense and with prior written permission. Units returned must be in

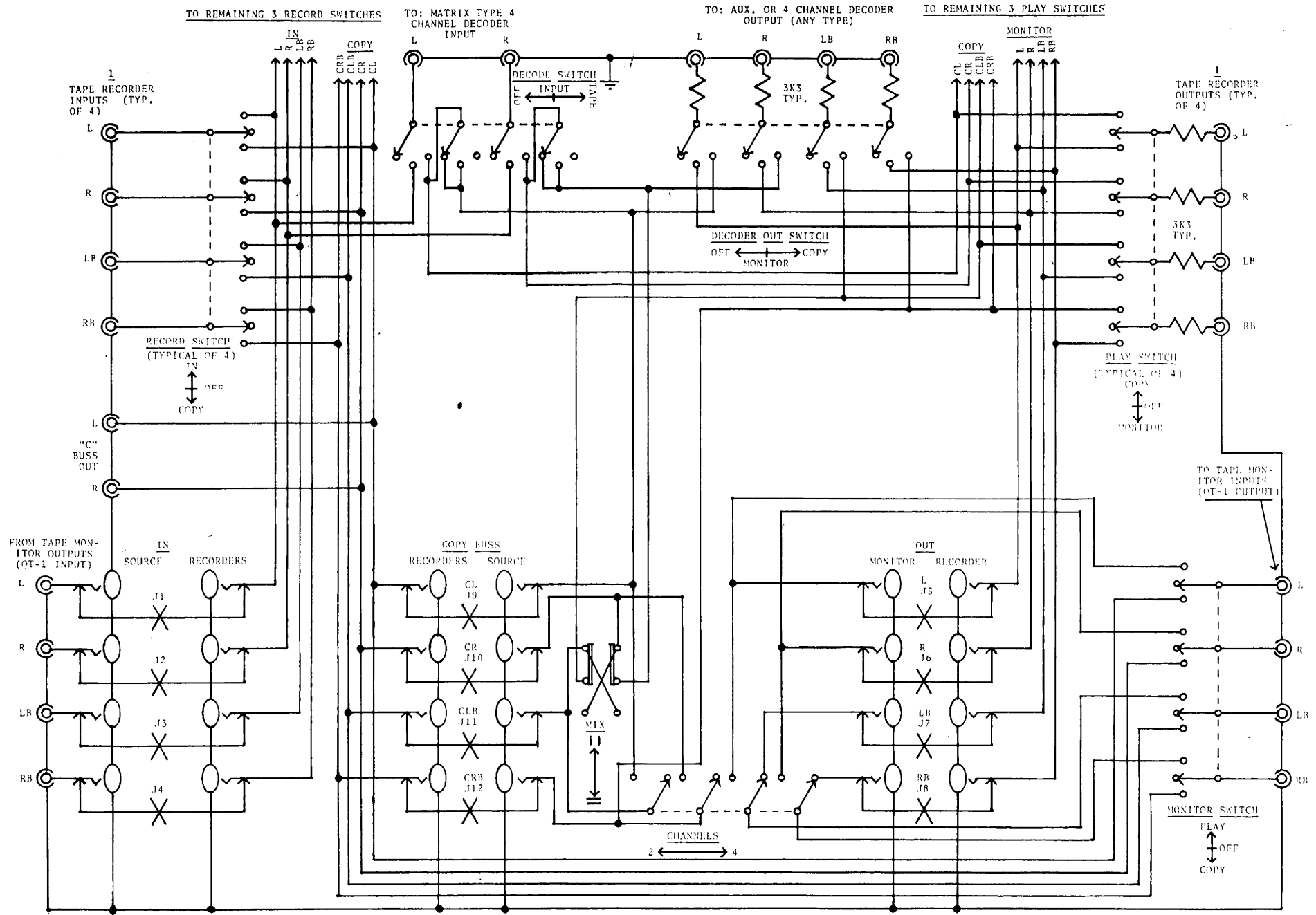
original circuit condition, modified units cannot be repaired under warranty.

Accidental damage and shipping damage are not considered defects under the terms of this warranty. Russound/FMP, Inc. assumes no responsibility for defects resulting from abuse, modifications, or from servicing performed by any agency or person not specifically authorized in writing by Russound/FMP, Inc.

PARTS LIST:

- 1- QT-1 in walnut finish cabinet.
- 1- Operation manual
- 16-Patch cords
- 6- Blank panel prints for reference marking.

Additional patch cords are available at your dealer, or direct from Russound/FMP, Inc. Sold in packages of 4, \$9.95 per package.



SCHEMATIC, RUSSOUND/FMP, INC. MODEL OT-1