This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT! FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:

WATER AND MOISTURE: Appliance should not be used near water (near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement or near a swimming pool, etc). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

POWER SOURCES: The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

GROUNDING OR POLARIZATION: Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

POWER CORD PROTECTION: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

SERVICING: The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

FUSING: If your unit is equipped with a fuse receptacle, replace only with the same type fuse. Refer to replacement text on the unit for correct fuse type.

SAFETY INSTRUCTIONS (EUROPEAN)

The conductors in the AC power cord are colored in accordance with the following code.

GREEN & YELLOW—Earth BLUE—Neutral BROWN—Live

U.K. MAIN PLUG WARNING: A molded main plug that has been cut off from the cord is unsafe. NEVER UNDER ANY CIRCUMSTANCES SHOULD YOU INSERT A DAMAGED OR CUT MAIN PLUG INTO A POWER SOCKET.

LIMITED WARRANTY

Your Carvin product is guaranteed against failure for ONE YEAR unless otherwise stated. Carvin will service and supply all parts at no charge to the customer providing the unit is under warranty. Shipping costs are the responsibility of the customer. CARVIN DOES NOT PAY FOR PARTS OR SERVICING OTHER THAN OUR OWN. A COPY OF THE ORIGINAL INVOICE IS REQUIRED TO VERIFY YOUR WARRANTY. Carvin assumes no responsibility for horn drivers or speakers damaged by this unit. This warranty does not cover, and no liability is assumed, for damage due to: natural disasters, accidents, abuse, loss of parts, lack of reasonable care, incorrect use, or failure to follow instructions. This warranty is in lieu of all other warranties, expressed or implied. No representative or person is authorized to represent or assume for Carvin any liability in connection with the sale or servicing of Carvin products. CARVIN SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

When RETURNING merchandise to the factory, you may call for a return authorization number. Describe in writing each problem. If your unit is out of warranty, you will be charged the current FLAT RATE for parts and labor to bring your unit up to factory specifications.

HELP SECTION

1) MIXER WILL NOT TURN ON

Check the power to the amp. Check for tripped circuit breakers, unplugged extension cords or power-strip switches that may be turned off. Check the fuse. If a dark brownish color or no wire can be seen within the glass tube, then replace. The mixer may be perfectly fine but occasionally a fuse may blow because of high AC voltage surges. After the fuse has been replaced with the proper Slow Blow value and if the fuse fails again, the mixer will require servicing.

2) KEEP YOUR MIXER LOOKING NEW

Use caution to avoid spilling liquids or allowing any other foreign matter inside the unit. The top of the mixer can be wiped from time to time with a dry or slightly damp cloth in order to remove dust and bring back the new look. A suggestion is to cover the mixer when not in use. This can be done with a cloth or a small towel to reduce the amount of dust collection on the mixer. Well cared for equipment is usually friendlier equipment in the long run.

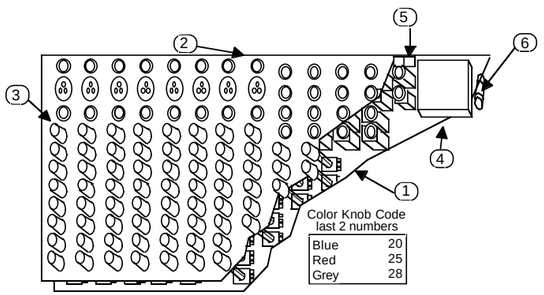
REPLACEMENT PARTS LIST (for circuit cards)

CAUTION

RISK OF ELECTRIC SHOCK

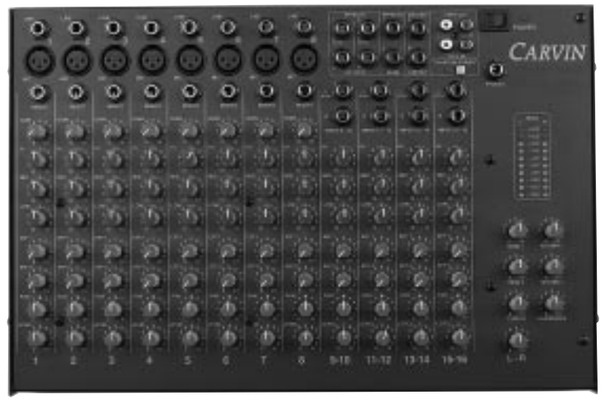
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL! THIS UNIT CONTAINS HIGH VOLTAGE INSIDE!

Ref. Des.	DESCRIPTION	Carvin P/N
A1	Op Amp NE5532	60-55320
A2-A11	Op Amp MC4558	60-45580
A12	Op Amp NE5532	60-55320
A13-A15	Op Amp MC4558	60-45580
A201	Op Amp NE5532	60-55320
A304-A306	Op Amp MC4558	60-45580
A404-A406	Op Amp MC4558	60-45580
A504-A506	Op Amp MC4558	60-45580
B1- B3	Jumper .35"	50-00035
C1,C2	82PF 500 Volt	45-82052
C3-C5	10µF 50V	47-10051
C6	47µF 63 Volt	47-47061
C7	39PF 500V	45-39052
C8	0.047µF 100V	46-47312
C9	330PF 1000 Volt	45-33113
C10	0.0047µF 100 Volt	46-47212
C11	10µF 50V	47-10051
C12	39PF 500 Volt	45-39052
C13	47µF 63 Volt	47-47061
C14, C15	1000µF 25V	47-10225
C16-C22	10µF 50V	47-10051
C23	0.047µF 100V	46-47312
C24	0.0022µF 100V	46-22212
C25, C26	1000µF 25V	47-10225
C27-C33	10µF 50V	47-10051
C34	330PF 1000 Volt	45-33113
C35	0.0047µF 100 Volt	46-47212
C36	330PF 1000 Volt	45-33113
C37	0.0047µF 100 Volt	46-47212
C38, C39	39PF 500 Volt	45-39052
C40-C42	10µF 50V	47-10051
C43	0.0022µF 100V	46-22212
C44	0.047µF 100V	46-47312
C45	0.047µF 100V	46-47312
C60	10µF 50V	47-10051
C61	39PF 500 Volt	45-39052
C62	10µF 50V	47-10051
C63	39PF 500 Volt	45-39052
C64	10µF 50V	47-10051
C65	39PF 500 Volt	45-39052
C67	10µF 50V	47-10051
C68	39PF 500 Volt	45-39052
C69	10µF 50V	47-10051
C70	39PF 500 Volt	45-39052
C71	10µF 50V	47-10051
C72	39PF 500 Volt	45-39052
C74	39PF 500 Volt	45-39052
C77	39PF 500 Volt	45-39052
C80	39PF 500 Volt	45-39052
C83	39PF 500 Volt	45-39052
C90-C93	10µF 50V	47-10051
C104	0.047µF 100V	46-47312
C105	0.047µF 100V	46-47312
C201	82PF 500 Volt	45-82052
C202	82PF 500 Volt	45-82052
C203-C205	10µF 50V	47-10051
C206	47µF 63 Volt	47-47061
C207	39PF 500V	45-39052
C209	330PF 1000 Volt	45-33113
C210	0.0047µF 100 Volt	46-47212
C211	10µF 50V	47-10051
C212	39PF 500 Volt	45-39052
C213	47µF 63 Volt	47-47061
C330-C333	10µF 50V	47-10051
C334	330PF 1000 Volt	45-33113
C335	0.0047µF 100 Volt	46-47212
C336	330PF 1000 Volt	45-33113
C337	0.0047µF 100 Volt	46-47212
C338	39PF 500 Volt	45-39052
C339	39PF 500 Volt	45-39052
C340, C341	10µF 50V	47-10051
C430-C433	10µF 50V	47-10051
C434	330PF 1000 Volt	45-33113
C435	0.0047µF 100 Volt	46-47212
C436	330PF 1000 Volt	45-33113
C437	0.0047µF 100 Volt	46-47212
C438	39PF 500 Volt	45-39052
C439	39PF 500 Volt	45-39052
C440, C441	10µF 50V	47-10051
C530-C533	10µF 50V	47-10051
C534	330PF 1000 Volt	45-33113
C535	0.0047µF 100 Volt	46-47212
C536	330PF 1000 Volt	45-33113
C537	0.0047µF 100 Volt	46-47212
C538	39PF 500 Volt	45-39052
C539	39PF 500 Volt	45-39052
C540, C541	10µF 50V	47-10051
D1-D3	Green small	60-75330
D4	Yellow small	60-24251
D5, D6	Red small	60-75320
D7-D10	Green small	60-75330
D11	1N1914 HI SPD	61-19140
D12-D14	Green small	60-75330
D15	Yellow small	60-24251
D16, D17	Red small	60-75320
D18-D21	Green small	60-75330
D22	1N1914 HI SPD	61-19140
D23, D24	Red small	60-75320
D25-D28	1N4003	60-40030
D29, D30	1N1914 HI SPD	61-19140
F1	Fuse Clips	23-03529
J1	7 Pin Plastic	21-06457
J2	XLRF Neutrik	21-40000
J3-J11	3 Pin Plastic	21-06453
J12	Phone Jack x4	21-40022
J13	7 Pin Plastic	21-06457
J101, J102	3 Pin Plastic	21-06453
J201	7 Pin Plastic	21-06457
J202	XLRF Neutrik	21-40000
J203	3 Pin Plastic	21-06453
J301, J302	3 Pin Plastic	21-06453
J401, J402	3 Pin Plastic	21-06453
J501, J502	3 Pin Plastic	21-06453
P1	B50K D Vert 9mm	71-09053
P2-P4	B50K-C D Vert 9mm	71-09052
P5, P6	B50K D Vert 9mm	71-09053
P7	B5K-C D Vrt 9m 35	71-09050
P8	B50K D Vrt 12m 35	71-13056
P9-P11	B100Kx2 D Vrt 12m	71-13064
P12, P13	B50K D Vrt 9m 35	71-09053
P14, P15	B100Kx2 D Vrt 12m	71-13064
P101-P103	B50Kx2-C D Vrt 12	71-13062
P104, P105	B50K D Vrt 9m 35	71-09053
P106	B5K-C D Vrt 9m 35	71-09050
P107	B100Kx2 D Vrt 12m	71-13064
P201	B50K D Vrt 9m 35	71-09053
P202-P204	B50K-C D Vert 9mm	71-09052
P205,P206	B50K D Vrt 9m 35	71-09053
P207	B5K-C D Vrt 9m 35	71-09050
P208	B50K D Vrt 9m 35	71-09053
P301-P303	B50Kx2-C D Vrt 12	71-13062
P304, P305	B50K D Vrt 9m 35	71-09053
P306	B5K-C D Vrt 9m 35	71-09050
P307	B100Kx2 D Vrt 12m	71-13064
P401-P403	B50Kx2-C D Vrt 12	71-13062
P404, P405	B50K D Vrt 9m 35	71-09053
P406	B5K-C D Vrt 9m 35	71-09050
P407	B100Kx2 D Vrt 12m	71-13064
P501-P503	B50Kx2-C D Vrt 12	71-13062
P504, P505	B50K D Vrt 9m 35	71-09053
P506	B5K-C D Vrt 9m 35	71-09050
P507	B100Kx2 D Vrt 12m	71-13064
Q1	7815 +15V	60-78150
Q2	7915 -15V	60-79150
R1, R2	5.62K 0.25W	50-56231
R3	10K 0.25W	50-10045
R4, R5	2.2K 0.25W	50-22035
R6, R7	4.7K	50-47035
R8	1.5K	50-15035
R9	47K	50-47045
R10	4.7K 0.25W	50-47035
R11	100K 0.25W	50-10055
R12	150K 0.25W	50-15055
R13	4.7K 0.25W	50-47035
R14	470Ω 0.25W	50-47025
R15	10K 0.25W	50-10045
R16	4.7K 0.25W	50-47035
R17	22K	50-22045
R18	4.7K 0.25W	50-47035
R19-R21	22K	50-22045
R22	Jumper .35"	50-00035
R25, R26	22K	50-22045
R27, R28	10K	50-10045
R30, R31	Jumper .35"	50-00035
R32	4.7K 0.25W	50-47035
R33, R34	Jumper .35"	50-00035
R35	4.7K 0.25W	50-47035
R36	100K 0.25W	50-10055
R37	150K 0.25W	50-15055
R38	4.7K 0.25W	50-47035
R39	100K 0.25W	50-10055
R40	150K 0.25W	50-15055
R41	4.7K 0.25W	50-47035
R42	10K 0.25W	50-10045
R43	4.7K 0.25W	50-47035
R44	10K 0.25W	50-10045
R45	4.7K 0.25W	50-47035
R46, R47	22K	50-22045
R48, R49	10K 0.25W	50-10045
R50, R51	22K	50-22045
R53, R54	100K	50-10055
R60	22K 0.25W	50-22045
R61	10K	50-10045
R62	22K 0.25W	50-22045
R63	10K	50-10045
R64	22K 0.25W	50-22045
R65	10K	50-10045
R67	22K 0.25W	50-22045
R68	10K	50-10045
R69	22K 0.25W	50-22045
R70	10K	50-10045
R71	22K 0.25W	50-22045
R72	10K	50-10045
R74, R76	470Ω 0.25W	50-47025
R80	22K 0.25W	50-22045
R81	10K 0.25W	50-10045
R83	22K 0.25W	50-22045
R84	10K 0.25W	50-10045
R86-R89	470Ω	50-47025
R90	10K	50-10045
R91	22K 0.25W	50-22045
R92	100Ω 0.25W	50-10025
R93	10K	50-10045
R94	22K 0.25W	50-22045
R95	100Ω 0.25W	50-10025
R100	2.2K 0.25W	50-22035
R101, R102	Jumper .35"	50-00035
R105, R106	2.2K 0.25W	50-22035
R107	150K 0.25W	50-15055
R108	3.3K	50-33035
R109	8.2K 0.25W	50-82035
R110	3.3K	50-33035
R111	8.2K 0.25W	50-82035
R112	15K	50-15045
R113	36K	50-36045
R115	15K	50-15045
R116	36K	50-36045
R201, R202	5.62K 0.25W	50-56231
R203	10K 0.25W	50-10045
R204, R205	2.2K 0.25W	50-22035
R206, R207	4.7K	50-47035
R208	1.5K	50-15035
R209	47K	50-47045
R210	4.7K 0.25W	50-47035
R211	100K 0.25W	50-10055
R212	150K 0.25W	50-15055
R213	4.7K 0.25W	50-47035
R214	470Ω 0.25W	50-47025
R215	10K 0.25W	50-10045
R216	4.7K 0.25W	50-47035
R217	10K 0.25W	50-10045
R218	4.7K 0.25W	50-47035
R219	10K 0.25W	50-10045
R220, R221	4.7K 0.25W	50-47035
R330, R331	Jumper .35"	50-00035
R332	4.7K 0.25W	50-47035
R333, R334	Jumper .35"	50-00035
R335	4.7K 0.25W	50-47035
R336	100K 0.25W	50-10055
R337	150K 0.25W	50-15055
R338	4.7K 0.25W	50-47035
R339	100K 0.25W	50-10055
R340	150K 0.25W	50-15055
R341	4.7K 0.25W	50-47035
R342	10K 0.25W	50-10045
R343	4.7K 0.25W	50-47035
R344	10K 0.25W	50-10045
R345	4.7K 0.25W	50-47035
R346, R347	22K	50-22045
R348, R349	10K 0.25W	50-10045
R350, R351	22K	50-22045
R353, R354	100K	50-10055
R430, R431	Jumper .35"	50-00035
R432	4.7K 0.25W	50-47035
R433, R434	Jumper .35"	50-00035
R435	4.7K 0.25W	50-47035
R436	100K 0.25W	50-10055
R437	150K 0.25W	50-15055
R438	4.7K 0.25W	50-47035
R439	100K 0.25W	50-10055
R440	150K 0.25W	50-15055
R441	4.7K 0.25W	50-47035
R442	10K 0.25W	50-10045
R443	4.7K 0.25W	50-47035
R444	10K 0.25W	50-10045
R445	4.7K 0.25W	50-47035
R446, R447	22K	50-22045
R448, R449	10K 0.25W	50-10045
R450, R451	22K	50-22045
R453, R454	100K	50-10055
R530, R531	Jumper .35"	50-00035
R532	4.7K 0.25W	50-47035
R533, R534	Jumper .35"	50-00035
R535	4.7K 0.25W	50-47035
R536	100K 0.25W	50-10055
R537	150K 0.25W	50-15055
R538	4.7K 0.25W	50-47035
R539	100K 0.25W	50-10055
R540	150K 0.25W	50-15055
R541	4.7K 0.25W	50-47035
R542	10K 0.25W	50-10045
R543	4.7K 0.25W	50-47035
R544	10K 0.25W	50-10045
R545	4.7K 0.25W	50-47035
R546, R547	22K	50-22045
R548, R549	10K 0.25W	50-10045
R550, R551	22K	50-22045
R553, R554	100K	50-10055
S1	DPDT Push Vert	25-02201
T1	Toroid 7VA	15-70033
U1,U2	Display LM3915	60-39150
Z1	Zener 6.2V 1N4735A	60-47350



#	DESCRIPTION	CARVIN #	QTY
1.	PCB Assembly	80-16204	15
2.	Front Panel Metal	10-16204	1
3.	Knob 10 D shaft (COLOR)	07-120(--)	---
4.	AC Receptical	21-02804	1
5.	Power Switch	25-62116	1
6.	Internal Fuse (see fuse chart)	80-02105	1

CARVIN ENGINEERING DATA **SM162 STUDIO MATE 16CH STEREO MIXER** OPERATING MANUAL



SM162

Congratulations on your purchase of the SM162 16 channel stereo mixer. Your new Studio Mate mixer demonstrates CARVIN's commitment to the pro audio world by offering sophisticated signal mixing and processing in a compact easy to use console. The Studio Mate is designed to be a powerful tool for the home studio where limited space and high performance are the main requirements. Its features make it ideal for mixing to cassette, DAT or for hard disk recording with a computer. The Studio Mate is also rugged enough to handle many live applications. The SM162's high quality construction will provide years of trouble-free performance and will reproduce your music flawlessly. Enjoy your new SM162!

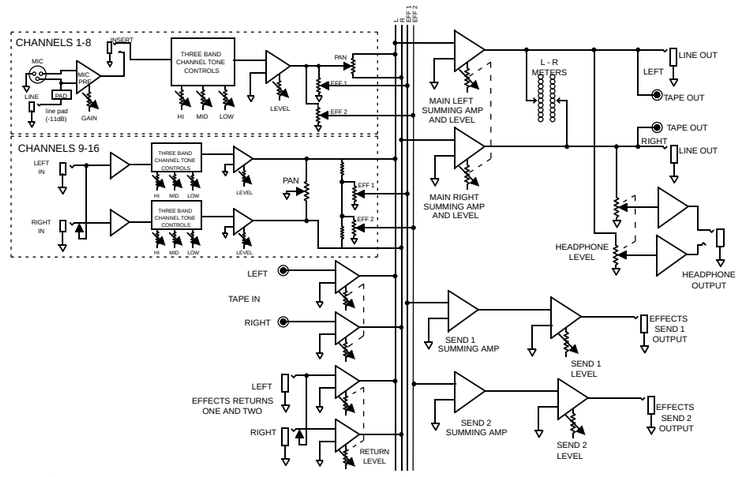
16 CHANNEL OVERVIEW

There are 8 MIC/LINE input channels with XLR and 1/4" LINE inputs and PATCH insert jacks. There are also 4 STEREO input channels (8 mono) with two 1/4" LINE inputs each. The XLR channels feature input GAIN controls and provide Phantom power for condenser mics. There are 3 bands of EQ and 2 post fader effect SENDS on each channel. The master section features 2 SENDS and 2 stereo RETURNS along with RCA tape IN's and OUTs that can be used as a separate stereo channel with it's own level control. A master LEFT/RIGHT level control also feeds a 1/4" stereo headphone jack with its own level control. The stereo LED VU metering gives you bright,clear visibility of your output levels.

"SHELVING" EQ WITH ACTIVE TONE CIRCUITS

The SM162 incorporates 3 bands of EQ's per channel that offer smooth tone curves so your adjustments will sound natural and yet be effective. Depth is added to your bass because 80 Hz is chosen for the LOW frequency EQ controls instead of the usual 100 Hz. The HI EQ controls are set at 11.5k Hz which is slightly higher than the normal 10k Hz treble controls giving more top-end clarity. These are "shelving" type controls which cover the complete frequency band from 80 Hz down to 20 Hz and from 11.5K Hz up to 20k Hz. The MID EQ controls are a "band pass" type which peak at 2.2k Hz for added presence to your mid range tones. Because CARVIN uses "active" tone circuits, you are able to boost or cut your tones without any signal loss in your mixer.

STUDIO MATE BLOCK DIAGRAM



76-00162 996

RECEIVING INSPECTION—read before getting started

INSPECT YOUR MIXER FOR ANY DAMAGE which may have occurred during shipping. If any damage is found, please notify the shipping company and CARVIN immediately.

SAVE THE CARTON & ALL PACKING MATERIALS. In the event you have to re-ship your unit, always use the original carton and packing material. This will provide the best possible protection during shipment. CARVIN and the shipping company are not liable for any damage caused by improper packing.

SAVE YOUR INVOICE. It will be required for warranty service if needed in the future.

SHIPMENT SHORTAGE. If you find items missing, they may have been shipped separately. Please allow several days for the rest of your order to arrive before inquiring.

RECORD THE SERIAL NUMBER on the enclosed warranty card or below on this manual for your records. Keep your portion of the card and return the portion with your name and comments to us.

INTERNAL SIGNAL ROUTING WITH NO RF

Your balanced mic or instrument plugs directly into the high quality XLR Nortrics connectors (used in hundred thousand dollar consoles) and is then routed into the differential circuits for excellent hum and noise cancellation. As your signal continues within the console, a double-sided printed circuit board (FR-4 fire rated) carefully guards the circuit traces with a copper shield running over the traces. This eliminates RF interference and reduces crosstalk substantially. The printed circuit board has 931 plated-through holes which means that every component is soldered securely in three places (bottom, in hole and top). This offers unsurpassed component security while reducing circuit resistance for pure dynamic sound which is unaffected by poor solder connections.

MORE HEADROOM

Headroom is very important when designing a mixer—especially for recording. Lack of headroom will cause your sound to become distorted and muddy. This can happen when you turn the volume too high, if the input signal is too hot or if excess bass or treble is added. With most mixers, you have to reduce the input gain to fight headroom problems, but this just increases noise. That's why we have taken great care in the SM162 to make sure that each gain stage is properly designed and balanced with more headroom along the entire audio path. There is no headroom "bottle necking" at the summing stages, ensuring clean, pure audio throughout.

MICRO TOROID SUPPLY

You won't find the precision Micro Toroid Supply in any mixer except the SM162 and other CARVIN high-end products. Pure DC is generated from this power supply which features precision 7815 and 7915 voltage regulators which hold voltage tolerances to within .001%. Now you can go anywhere and never have to worry about the mixer giving you the exact output and sound you are accustomed to. Another big feature in this power supply is the precision wound Toroid transformer (not available from our competition) that gives unsurpassed rejection of noise and hum. You can place the SM162 over sensitive gear and not be concerned about injecting hum or noise into it like a standard transformer could. CARVIN has spared no expense to achieve studio quality performance.

PROFESSIONAL HEADPHONES

The SM162 is designed to be used with professional headphones. The impedance of the headphone set should be between 40 and 100 ohms with a sensitivity of at least or high than 100 dBm at 1k Hz with 1mv input. 8 ohm or 500 ohm and higher headsets are not recommended.

For your records, you may wish to record the following information.

Serial No._____ Invoice Date_____

MODEL SM162 SPECIFICATIONS:

Frequency Response:	Mic or Line Inputs: 20Hz-20KHz ±1dB
Total Harmonic Distortion:	Less than .009% MIC in - Master out
Equivalent Input Noise:	150 ohm source: -122dBu
Output Noise:	-90dBu Master Line Out (All Levels Minimum)
Output Headroom:	+20dB 1/4" unbalanced
Maximum Gain:	Mic in to Master Line Out: 70dB
Crosstalk:	Adjacent ch's: -60db at 1KHz
Common Mode Rejection:	-80db at 1KHz
Phantom Power:	All XLR Mic in channels
Channel EQ.:	3 band active,LOW: 100Hz ±12dB MID: 2.2KHz ±12dB HI: 11.5KHz ±12dB
Mic Input:	Balanced XLR input: -66 dBu
Line Input:	Unbalanced 1/4" Phone Jack -49dBV
Power Consumption:	10VA
Size and Weight:	(8 lbs) 2.5"H x 16.2"W x10.2"D

CARVIN
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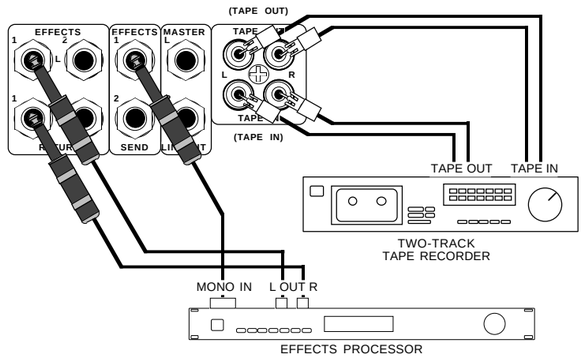
(619) 487-1600 (800) 854-2235
www.carvin.com

TAPE DECKS AND EXTERNAL EFFECTS

The basic hook up is simple, using four (or two stereo) RCA cables plug the TAPE OUT on the mixer into the tape deck's inputs, and the mixer's TAPE IN into the tape deck's outputs. Using the master L - R level control in conjunction with the tape deck's input recording level control, both the desired recording level can be adjusted and the master left right output listening level can be adjusted. Then the TAPE IN level control on the mixer can be adjusted to hear the tape decks playback out the master left and right line outputs.
NOTE: If the tape deck is in recording mode, be sure to have the TAPE IN control turned down. This will reduce possible feedback through the tape deck.

When using an effects processor, plug a cable from one of the two effects send 1/4"phone outputs on the mixer, into the input jack on the effects processor. Then for the return, plug one (or both for stereo) of the L/R EFFECTS RETURN 1/4" phone inputs, on the mixer, into the outputs on the effects processor. Using the channel EFF 1 or EFF 2 sends and the master send 1 or 2 set the output send level going to the effects processor. Then using the return 1 or 2 level controls, set the desired amount of effect heard in the master left right outputs.



STEREO LIVE SOUND SYSTEM

The Studio Mate mixer is not only a studio recording mixer, it can also be a great live sound, PA system mixer or a sub mixer. As a sub mixer, the Studio Mate could add extra channels or work as a monitor mixer. Here the main focus will be using the Studio Mate as the main mixer in a basic live sound system.

In a live sound reinforcement or a public address system (P.A. System), the input signals to the mixer will come from the microphones and instruments on the stage. Each microphone or instrument to be amplified by the P.A. system must be connected to one of the mixing console inputs. It is preferred to have as many of the stage instruments as possible plugged into the mixer. This allows the best overall sound control of the instruments as they are mixed together and then amplified by the P.A. system. The mixer can be operated on the stage or from a remote location in front of the stage using a snake cable to bring the signals from the stage to the mixer. The advantage of the remote operation allows the performance to be monitored and mixed from the audience's perspective.

THE MIC CHANNELS

The (XLR) balanced low impedance mic inputs can handle +15 dB levels with the gain control at minimum. These balanced inputs should be used whenever possible, because this format will ensure the best possible performance and lowest noise when operating with long cable lengths, such as with a snake. However, many times an unbalanced output (1/4 inch phone plug) from an instrument needs to be plugged into the mixer. In this case use the line inputs on these channels. If the snake cable is only equipped with XLR inputs use a XLR to 1/4" adapter or a "Direct box" to get through the snake.

THE STEREO CHANNELS

Where ever stereo line levels are present such as with CD players, keyboards, and stereo guitar preamplifiers, the stereo channels should be used. The stereo channels allow the user to control the stereo input with one set of controls. The result being equal adjustment to both the left and right signals. The stereo channels are also great as glorified effects returns or for multiple stereo background music mixes. If the mic/line channels are all filled, the stereo channels can be used as extra mono channels by plugging into only the left inputs.

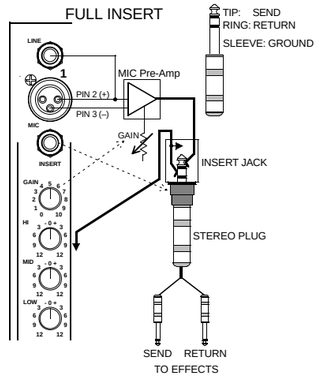
CONNECTING SPEAKERS & POWER AMPLIFIERS

Since the Studio Mate is a non-powered mixer (no internal amplifiers), an external power amplifier will have to be used to power the PA system speakers. When connecting the main power amplifiers, use the MASTER L - R LINE OUT jacks as the main outputs. When using a snake to feed the signals from the stage to the mixer, there are usually provisions for sending line output signals from the mixer to the stage. The (line level) MASTER L - R LINE OUT outputs can be plugged into these returns in the snake cable, and This will send the signal to the power amplifiers, usually placed on stage. Once the snake, or alternate means of cabling, carrying the signal has reached the stage, the connections are made to the power amplifier inputs. The power amp outputs can then be connected to the speakers.
Note: Speaker cables should be non-shielded and at least 16 gauge wire to prevent damage to the power amplifiers.

INSERTS AND DIRECT OUTS

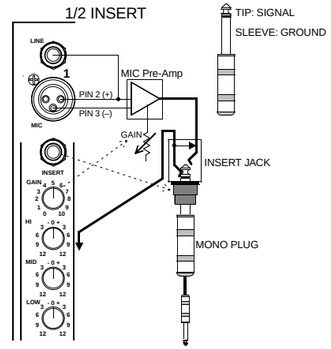
FULL INSERT

As described under the 1-8 MIC CHANNEL FEATURES the insert jack is a Tip Ring Sleeve (TRS) 1/4" phone jack, where the tip is the send, the ring is the return, and the sleeve is ground. When used as an insert point or in full insert mode the channel is opened up to allow an external piece of equipment to be inserted into the channels signal path. The channel signal, coming from the microphone preamplifier, will be forced to go through the external equipment before it can continue back through the channel re-entering before the channel tone controls. Most external equipment is not set up for the TRS plug directly, so an adapter cable is required. The adapter cable will have on one end the TRS plug and two mono plugs , either male or female, on the other end. The two plugs each have the ground connected to the sleeve and one has the return on its tip and the other has the send on its tip. This allows the send to be connected to the input of the external equipment and the return to its output completing the insert loop back to the channel.



HALF INSERT

The half insert connection creates a send signal without breaking the channels signal path. The insert in this mode is no longer used as an insert but it becomes what is called an "insert direct out". An insert direct out functions as a normal direct out, but the plug has to be half inserted and if an insert is needed on the same channel, some fancy cabling is required to perform both functions. The half insertion connects the tip of the plug being inserted to the ring of the jack, see the fig. If the jack is fully inserted, to where the tip of the plug connects to the tip of the jack, the internal jack switch will open and the channel's signal path will be broken. The connection will still function as a direct out, but the channel's signal will stop at the insert and not continue on to the rest of the channel and the masters, unless the insert is being used as described in the FULL INSERT section above with a TRS plug. The result of the half insert is multiple outputs are created for use in multi-track recording.



MULTI TRACK RECORDING

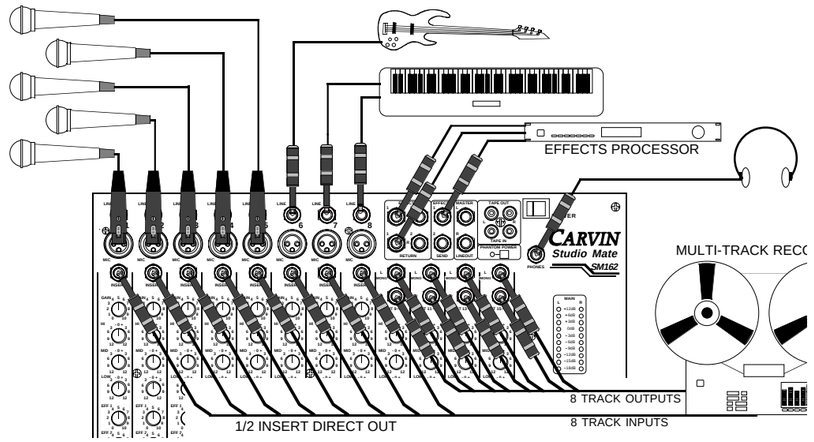
The following will explain the 8 and 4 track recording system diagrams using the Studio Mate as the recording console.

THE EIGHT TRACK SYSTEM

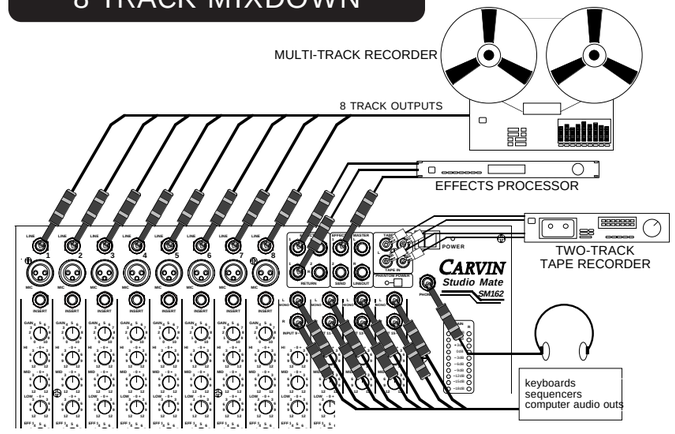
The eight track system is the more difficult of these two systems. The difficulty is having to repatch the 8 track's output connections in order to mix down to the final two track. In the recording stage of an 8 track recording session (see the top diagram on page 11) , the inserts of the 8 mic/line channels can be used to give 8 individual dry outputs for the 8 tape inputs of the recorder. The "dry" means when using the insert as an output there is no EQ available, but only the original signal only boosted by the microphone preamplifier. In order to listen to the tracks while in the recording stage the stereo channels can be used for playback listening of the 8 recorded channels. With this arrangement a complete 8 track recording session can be done. Even scratch two track mix downs can be done through the stereo channels to the left right tape outputs on the mixer. When all the tracks are recorded to tape and ready for mix down, the 8 track machine outputs can be repatch to the line inputs on the 8 mic\line channels. This will provide individual effects sends and EQ on each track while mixing the 8 tracks down to 2 tracks through the left right tape out on the mixer. Also the stereo channels can be used for extra inputs such as midi equipment like keyboards, or drum modules which may not be on the 8 track.

THE FOUR TRACK SYSTEM

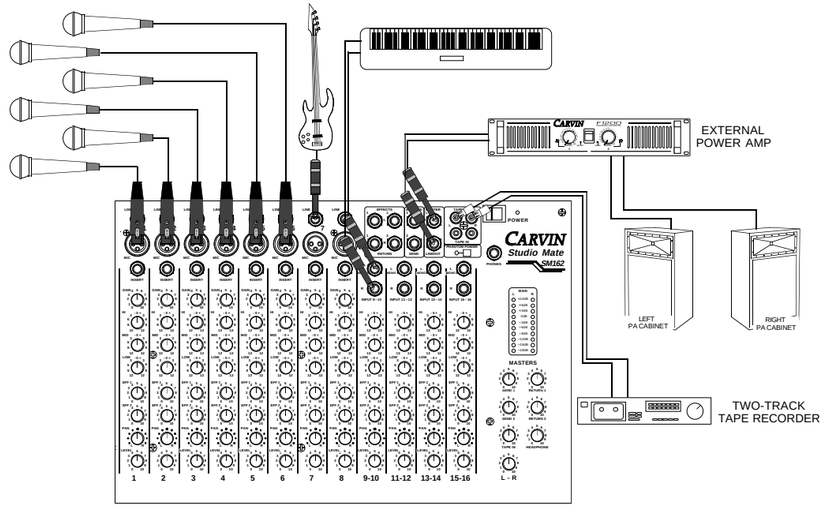
The four track system is much simpler in connection than the 8 track recorder. The connection and operation may be simpler, but any time the number of recording tracks is reduced, more thought has to go into recording each track. The four track system also provides more options when connecting to the mixer. A similar connection to the 8 track can be done with the 4 track inputs connected to channels 1-4 inserts (1/2 inserted for direct outs) and the 4 track outputs connected to channels 5-8 LINE inputs providing playback and mix down without repatching. The diagram on page 12 is another way to connect a four track recording system. The choice here was to have the left and right masters be two of the 4 track inputs. This in enables the rest of the channels to be mixed into the left right outputs for recording on the 4 track machine. Then two 1/2 insert directs are used for the other two inputs on the four track recorder. These would probably be tracks requiring EQ and effects added in the final mix down. Then when ready to mix down to the two track machine the switch is easy using the four channels with the outputs of the four track recorder, in this case channels 5-8. The pluses of this 4 track layout are: at any time a 4 track to 2 track mix down can be performed, and while recording the 4 tracks the EQ and added effects send levels of the 2 track mix down can be adjusted on channels 5-8.



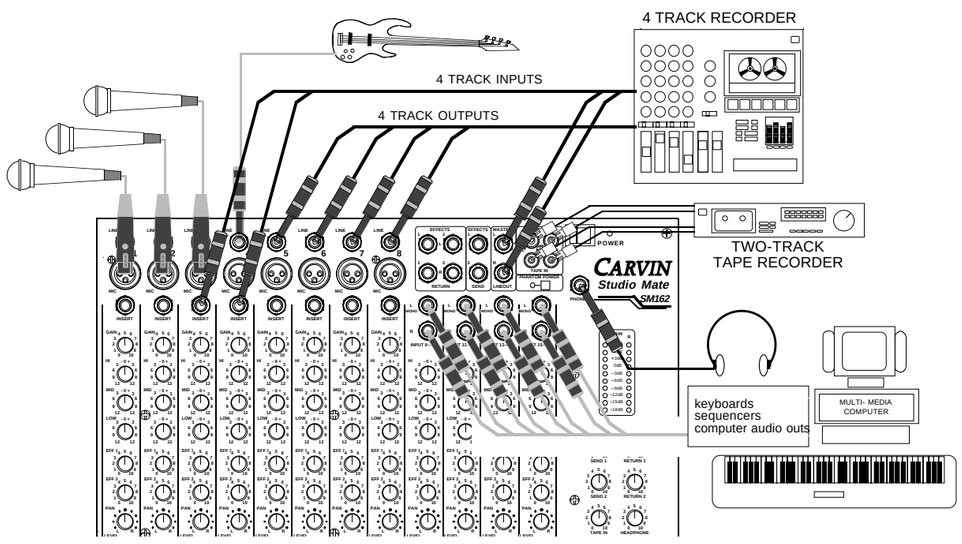
8 TRACK MIXDOWN



STEREO LIVE SOUND SYSTEM DIAGRAM



4 TRACK STUDIO DIAGRAM



SM162 PANEL CONTROLS

QUICK START UP

If you're like most new owners, you're probably in a hurry to plug your mixer in and use it. Here are some brief instructions to get you going quickly. With the mixer unplugged and the unit turned off, complete the following procedures:

1. CONNECTING AC POWER TO YOUR MIXER
   - Check the rear panel to make sure the mixer received uses the proper AC Line Voltage. (USA 120VAC, Europe 240 VAC ...etc.)
   - Use only a grounded (3 prong) power outlet to prevent a shock hazard. This gives the quietest grounding for your mixer.

2. TURNING YOUR MIXER ON
   - Adjust all channel and master level controls to their off positions (fully counter clockwise).
   - Adjust all "EQ" tone controls— the channel's Hi, Mid, and Bass and the two master 9 Band Graphic EQ's to their center detent position.
   - Adjust all the Channel "PAN" controls to their center detent position.
   - Turn the mixer on by the rear panel power switch and watch for the power LED to come on. Your mixer is now ready to operate.
3. CONNECTING INPUTS TO YOUR MIXER
   - For low level balanced devices such as microphones, plug into the balanced **MIC** inputs using a shielded microphone cable with XLR ends.
   - For high level unbalanced devices such as Tape Recorders and Keyboards plug into the **LINE** input jacks using a shielded cable with 1/4" phone ends.

1-8 MIC CHANNEL FEATURES

1. LINE INPUT JACK

The LINE input is a 1/4" phone jack designed for unbalanced line and instrument level inputs. Examples of these inputs would be instruments such as a guitar, a keyboard, an unbalanced mic, or a pre-amp output. The line input can be used at the same time the mic input is being used.

2. XLR MICROPHONE INPUT

The XLR MIC input is designed for balanced low impedance microphone input signals. The XLR connector is wired as per the industry standard where pin 1 is ground, pin 2 is non-inverting (positive), and pin 3 is inverting (negative).
Phantom power is available on every XLR input jack when the phantom power switch in the master section is pressed. This feature allows condenser microphones to be run directly from the mixer.

Note: When using phantom power make sure the phantom power is switched off before connecting or disconnecting microphones to the mixer. It is recommended to allow 5 seconds for the phantom power to discharge before making any microphone connections. Also, to avoid hearing a pop, turn down the main volume when turning on the phantom power.

3. INSERT JACK

The insert jack is a Tip Ring Sleeve (TRS) 1/4" jack where the tip is the send, the ring is the return and the sleeve is ground. The insert point is after the input (MIC-pre) amplifier and before the channel EQ section (see the Block Diagram page 9). When a 1/4" plug is fully inserted it breaks the connection between the mic-pre and the channel EQ. This, insert break point, allows external equipment to be used on only the channel it is inserted into. One common use is to insert a compressor into a loud channel. This will reduce any input spikes before they distort the channel's EQ or the master busses.
Another use for the insert jack is as a direct output. To achieve this function, insert a mono 1/4" plug into the first click of the jack. The result is a direct output signal from the channel that does not disturb the channels operation. A common use for the insert direct out is in multi tracking, when individual channels are recorded to separate tracks on a multi track recorder.

4. GAIN CONTROL

The gain control adjusts the input gain on both the line and mic input jacks. For the mic input, the gain goes from a +4dB min to +42dB of gain. For the line input the gain goes from a -7dB min to +29dB of gain. For optimum signal to noise performance, the gain control should be set for the highest level possible before distortion or clipping of the incoming signal. In order to reduce surprise feedback and other thumps start with the gain control at minimum and bring it up. If distortion is heard regardless of the position of the channel LEVEL control, lower the gain control until no distortion is heard.

5. CHANNEL TONE CONTROLS

Each channel features three tone controls LO, MID, and HI. All three controls function as boost /cut controls, where the center detent position neither boosts nor cuts. For boosting turn the control clockwise and for cutting, turn the control counterclockwise. The LO and HI controls are shelving type tone controls with corner frequencies at 80Hz and 11.5k Hz respectively. The shelving means for the LO control all the frequencies from 80Hz and down, the deep bass tones, will be effected. For the HI control the shelving means all the frequencies from 11.5k Hz and up, the high treble tones, will be effected. The MID control is a band pass type of tone control. The band pass means a middle section of frequencies centered around 2.2kHz, but do not over-lap the HI and LO controls. The MID affects the clarity of the average persons spoken voice. Also the MID encompasses the louder sometimes harsher tones that can distort the over all sound. Use these controls to change the tonal shape of the input signal and in many cases to reduce possible feedback in live situations using microphones near speakers. It is suggested the channel tone controls start out in their center detent positions where they do not affect the original incoming signal. Then, if needed, adjust the tone controls to change the sound.

6. CHANNEL EFFECTS 1 AND EFFECTS 2

These controls are identical in function, both adjust the volume of the channel going to the effects send master controls. The only difference is EFF 1 goes to Send 1 and EFF 2 goes to Send 2. Both controls are post channel level. This means adjustments in the channel's EQ or level controls will effect the sound and volume of the EFF 1 and EFF 2 sends.

7. CHANNEL PAN CONTROL

The PAN control adjusts where the channel is heard in the stereo field of the stereo master outputs. If it is turned to the extreme left, then the channel will only be heard in the left master output and similarly only in the right master output if turned to the extreme right. In the center position the channel is heard equally in both the left and right main outputs. A good starting point for the pan is in the center position. Then if stereo placement is needed, a quarter turn to the desired side from the center position gives a smooth placement in the stereo field, or if desired a full turn to one side gives a hard placement.

8. CHANNEL LEVEL CONTROL

The LEVEL control adjusts the final volume of the channel before going to the Pan control. Here is where the individual channel volumes are adjusted to make up the desired mix heard at the master left and right outputs.

9-16 STEREO LINE CHANNEL FEATURES

9. LEFT/ RIGHT LINE INPUT JACKS

These LINE inputs are 1/4" phone jacks designed for unbalanced line and instrument level inputs. Examples of these inputs would be instruments such as a guitar, a keyboard, an unbalanced mic, or multi track outputs. If a mono input is needed, use the Left input jack and the channel will act like a mono channel with a normal functioning pan going to both Left and right masters.

10. CHANNEL TONE CONTROLS

Each channel features three stereo tone controls LO, MID, and HI. All three controls function as boost and cut controls, where the center detent position neither boosts nor cuts. Each tone control effects both the left and right channels, so if the channel is used as a dual mono channel both inputs will be effected by tone control changes. For more on the tone control sounds see the channel tone controls.

11. CHANNEL EFFECTS 1 AND EFFECTS 2

These controls are identical in function. Both adjust the volume of the channel going to the effects send master controls. The signal taken from the channel is an equal mixture of both the left and right signals. The only difference is EFF 1 goes to Send 1 and EFF 2 goes to Send 2. Both controls are post channel level. This means adjustments in the channel's EQ or level controls will effect the sound and volume of the EFF 1 and EFF 2 sends.

12. CHANNEL PAN CONTROL

The PAN control adjusts which side of the stereo channel is heard in the stereo main outputs. If it is turned to the extreme left, then only the left channel will be heard in the left main output and similarly only the right side is heard in the right main output if turned to the extreme right. In the center position both sides are heard.

13. CHANNEL LEVEL CONTROL

The LEVEL control adjusts the final volume of the channel before going to the Pan control. Here is where the individual channel volumes are adjusted to make up the desired mix heard at the master outputs.

MASTER CONTROLS

14. L/R MASTER CONTROL

The L/R master control is the master volume control for the left - right stereo mix. This volume receives its signals from the channel pan controls and generates the volume heard in the left and right main output jacks.

15. HEADPHONE LEVEL CONTROL

The HEADPHONE level control is the master volume for the headphone jack. This volume receives its signals from the main Left/Right level control.

16. SEND 1 AND SEND 2 CONTROLS

The SEND 1 and SEND 2 master controls are the master volumes for the EFF 1 and EFF 2 sends on the channels. The output of these controls are heard at the effects send 1 and 2 output jacks. The typical use of effects sends is to drive external Effects processors, but it can also be used as another stage monitor mix or headphone mix, if needed.

17. EFFECTS RETURN 1AND 2 CONTROLS

The RETURN 1 and RETURN 2 controls are stereo effects return volume controls. They receive input from the LEFT and RIGHT 1/4" EFFECTS RETURN jacks. These volumes control the return level going to the master left right stereo mix. A mono return into the stereo mix can be achieved by simply feeding the mono signal into the Left return jack. These stereo returns can also be used as just another input to the stereo mix for a keyboard or other stereo and mono gear.

18. TAPE IN CONTROL

The TAPE IN control is a stereo tape return volume control. It receives its input from the L/R TAPE RTN RCA jacks. This volume controls the return level feeding the master L/R stereo mix. A mono TAPE IN into the stereo mix can be achieved by simply feeding the mono signal into both Left and right RCA jacks. The stereo TAPE IN can also be used as just another input to the stereo mix for a keyboard or other stereo gear.

MASTER CONNECTORS

19. STEREO EFFECTS RETURN 1 AND 2 JACKS

The stereo EFFECTS RETURN 1 and 2 jacks are the input jacks for the stereo return 1 and 2 master controls.

20. EFFECTS SEND 1 AND 2 JACKS

The EFFECTS SEND 1 and 2 jacks are the output jacks for effects send 1 and 2 master controls.

21. LEFT AND RIGHT LINE OUT JACKS

The LEFT and RIGHT LINE OUT jacks are post graphic EQ line output jacks for the stereo mix. The same signals are also being fed to the TAPE OUT RCA jacks.

22. TAPE OUT AND TAPE IN RCA JACKS

The LEFT/RIGHT TAPE OUT RCA jacks deliver the main Left - Right mix output in RCA jacks thus eliminating the need for RCA to 1/4" adapters. The LEFT/RIGHT TAPE IN RCA jacks are RCA inputs to the TAPE IN level control.
The TAPE IN jacks can also be used for returning another effects processor or instrument such as a keyboard to the main mix. In most cases this would be where the mix down deck plugs in.
The RCA jacks are Ideal for using a cassette deck to record a mix using the TAPE OUT jacks and playing it back through the TAPE IN jacks with out using up any channels for play back or having to use adapters to hook up the cassette deck.

23. POWER LED

The Power LED indicates when the mixer is powered up.

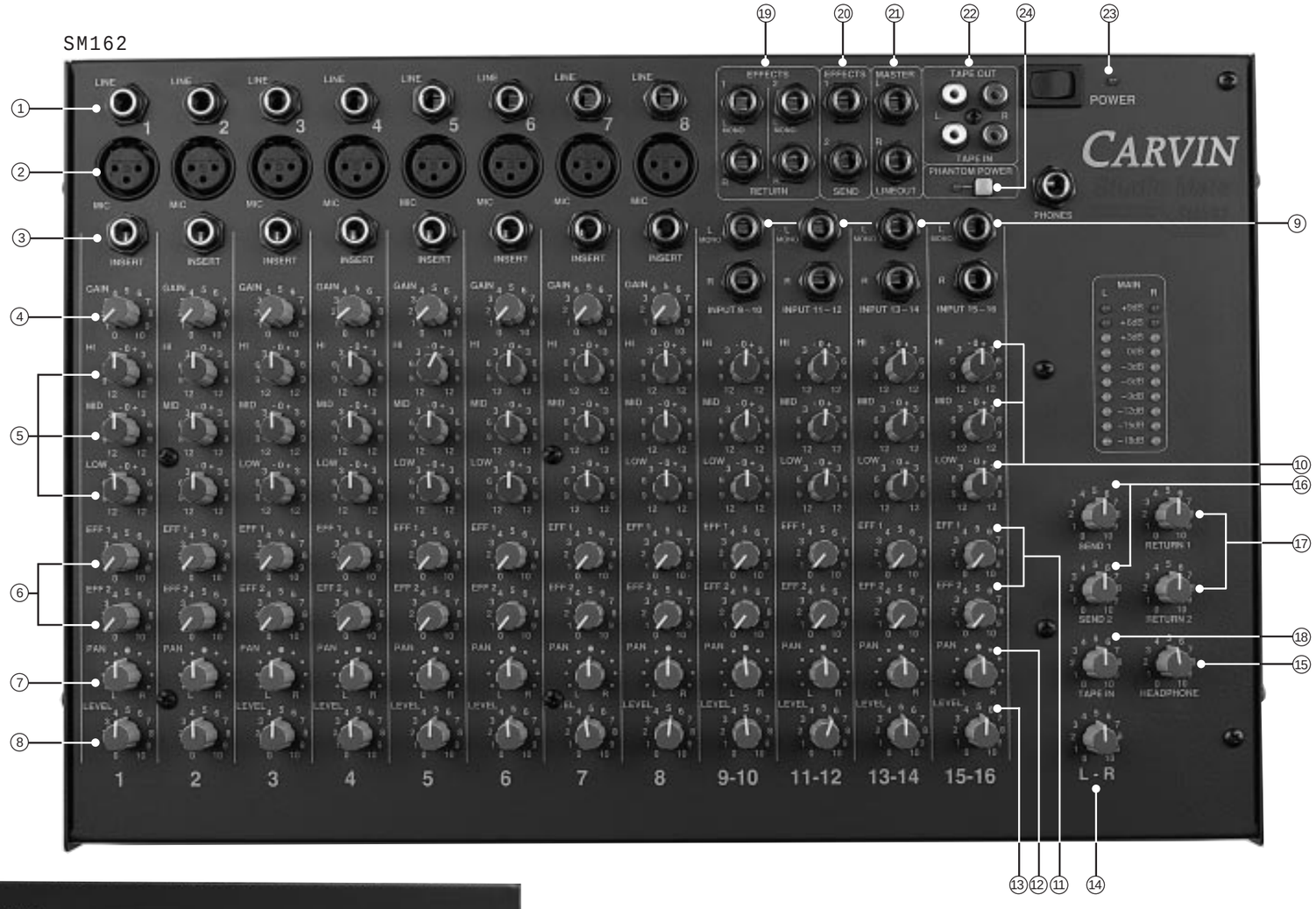
24. PHANTOM POWER SWITCH AND LED

The PHANTOM power switch turns on the microphone phantom power in the 8 MIC/LINE channel XLR jacks. The phantom power is used for supplying a bias voltage to condenser microphones. The LED indicates the phantom power is turned on. The phantom power will not damage dynamic microphones.

25. AC POWER & FUSE

The detachable AC POWER CORD supplied is designed to operate with one type of voltage (the European 230V export model uses a CEE-7 plug cord set). Check the rear power cord label for the proper voltage and fuse value. Plug the cord into a grounded "3" prong" power source. No attempt should ever be made to use the amp without the ground connected.
The FUSE is located within the AC power cord receptacle. To check or replace the fuse, remove the power cord, place a screwdriver under the "FUSE" cap and pull the fuse holder out. Some models may be equipped with a spare fuse within the holder. The fuse type is a 250V Slow Blow SB 5 x 20mm rated at 1/4A for 120V & 1/8A for 230V models. Do not use fast acting fuse, only a SLOW BLOW (SB) type fuse will work.

SM162



SM162 REAR PANEL