

**5401NQ, 5401NQ-8, 5400NE**

**FOUR INPUT, ONE OUTPUT MIXER CARDS**

**GENERAL**

The 5401NQ subgroup is specifically designed for Mix Minus applications in conjunction with IED’s 4000 Series and 4800 Series Automatic Mixer Systems. The auxiliary and direct outputs of the automatic mixers are fed to the 5401NQ so that proper nulling of the audio levels can be obtained. For input and output terminal connection information refer to figures 3 and 4.

**UNBALANCED SOURCE - TERMINATION JUMPERS**

When an input is being sourced from an unbalanced output (e.g. direct output of an IED 4452 card) the ‘-’ side of the input must be grounded. Jumpers J8 - J11 ground the ‘-’ input without the use of a wire jumper at the screw terminals. For unbalanced sources jumpers must be installed. For balanced sources such as the Aux and Direct Outputs of the IED 4400/4800 Automatic Mixers, and the Aux Output of the IED 4452 Automatic Mixer, no jumper is installed. See figure 1 for jumper locations and channel assignments.

**UNBALANCED SOURCE - GAIN JUMPERS**

When an input is being sourced from an unbalanced output such as the Direct Output of an IED 4452 Automatic Mixer, the gain is down 6 dB with respect to the reference input (e.g., the Aux Output of a 4452 card). Jumpers J4 - J7 can be used to make gain adjustments between unbalanced sources without changing the gain of any other device. Balanced sources will have no jumper installed and unbalanced sources will have a jumper installed. See figure 1 for jumper locations and channel assignments.

**CHANNEL GAIN/MIX MINUS NULL ADJUSTMENT**

In Mix Minus applications, 8-position DIP switches SW2 - SW5 are used to set up the nulls. See figure 1 for location. In non-Mix Minus applications, these same DIP switches are used to set up input gain.

DIP SWITCH SETTINGS	GAIN, dB	NULL, dB	DIP SWITCH SETTINGS	GAIN, dB	NULL, dB
1	4.55	-3.0	3 & 5	2.04	-13.0
1 & 5	4.25	-4.0	3 & 6	1.74	-14.5
1 & 6	3.86	-5.0	3 & 5 & 6	1.52	-15.0
2	3.52	-6.0	4	1.43	-16.5
2 & 5	3.25	-7.0	4 & 5	1.22	-16.5
2 & 6	2.90	-8.0	4 & 6	0.95	-19.0
2 & 5 & 6	2.65	-9.0	4 & 5 & 6	0.75	-21.0
3	2.27	-10.5	7	0.0	Full Null (No Adjustment)

Table 1 - Null Settings



For Mix Minus applications there are specific methods for setting up the DIP switches. Normally, the auxiliary output would be connected to Input 1, but wired out of phase. Since Input 1 is the reference input for all null settings, DIP switch 7 would be 'On'. This is important, since all nulling is referenced from this DIP switch setting. Position 7 is used for complete nulls on all other non-reference inputs. The other 6 DIP switch positions are for setting up the nulls for each non-reference input with respect to the reference input. There are 16 different nulls that can be obtained. They are listed in table 1.

## OUTPUT VCA ENABLE

DIP switch SW1, position 2 enables/disables the output VCA. See figure 1 for location. This output VCA can only be used with an expansion 5032EP Frame since the VCA control is using the phantom power bus on the motherboard. When using a standard 5032 frame, the VCA must be disabled, since there are no provisions for wiring the VCA Control, and the phantom power bus will attenuate the output VCA. Switch position 'OFF' disables the VCA. Switch position 'On' enables the VCA. 0 VDC = 0 dB and +5 Volts = -65 dB. If further attenuation is required, then 0 - 10 VDC could be used to control the VCA. See figure 5 for VCA wiring details.

## EQ ENABLE

The 8 band EQ can be enabled or disabled using DIP switch SW1, position 3. See figure 1 for location. Switch position 'Off' disables EQ (flat response). Switch position 'On' enables the 8 band EQ. See EQ settings for EQ setup information.

## EQ SETUP

The output EQ consists of three 1 octave constant Q EQs centered at 250 Hz, 500 Hz, and 4 kHz, and five 1/3 octave constant Q EQs centered at 800 Hz, 1 kHz, 1.25 kHz, 1.6 kHz, and 2.0 kHz. The gains are adjustable from the front of the 5401Q card by trimpots. The gains can be set using figure 2 which details the trimpot positions and related gains.

## LOW PASS FILTER SETTINGS

The 12.5 kHz low pass filter (3 dB down at 12.5 kHz, 12 dB/octave slope) is controlled by DIP switch SW1, positions 4 and 5. See figure 1 for location. Position 4, when 'On', enables the low pass filter. Position 5, when 'On', bypasses the low pass filter (flat response). At least one of the two switch positions must be 'On', for audio to pass, but never should both be in the 'On' position. If both are in the 'On' position, distortion of the audio signal will occur.

## HIGH PASS FILTER SETTINGS

The 160 Hz and 315 Hz high pass filters (3 dB down at frequencies shown, 12 dB/octave slope) are controlled by DIP switch SW1 positions 6, 7, and 8. See figure 1 for location. Position 6, when 'On', enables the 315 Hz high pass filter. Position 7, when 'On', bypasses the high pass filters (flat response). Position 8, when 'On', enables the 160 Hz high pass filter. One and only one switch must be in the 'On' position. If more than one are in the 'On' position, distortion of the audio signal will occur.

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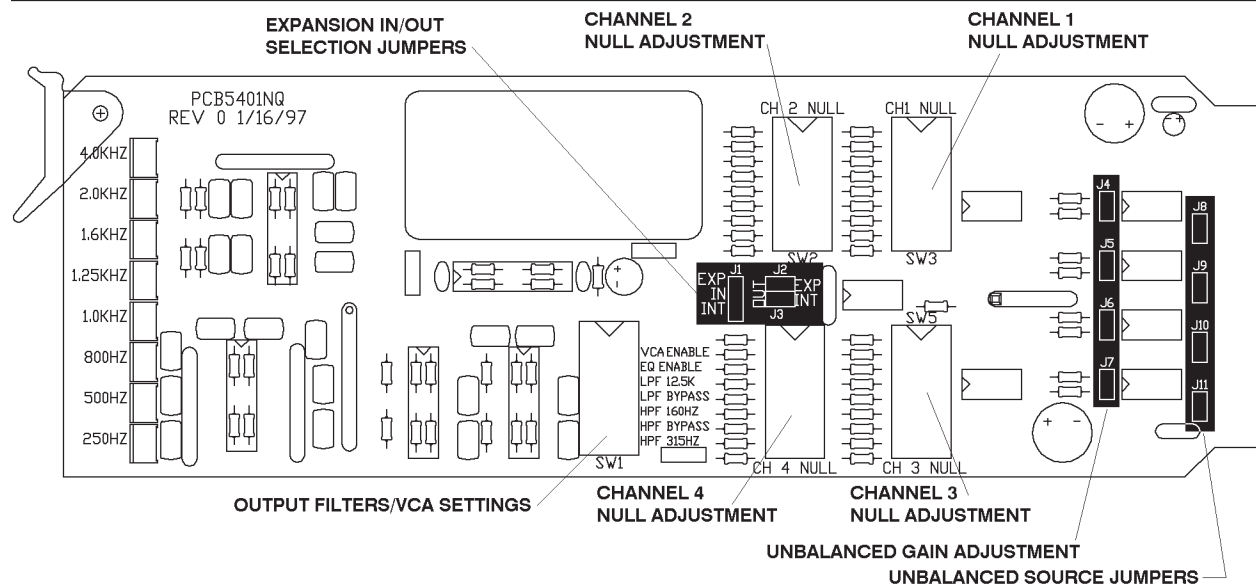
**EXPANSION IN/EXPANSION OUT SELECTION**

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The 5401NQ card can be expanded into or out of using jumper banks J1 - J3. See figure 1 for the location of the jumpers. To expand out to another 5401NQ card a shunt must be placed in the 'Exp Out' (J2) position. To source audio to the card's own output a shunt must be placed in the 'Int Out' (J3) position. The card is shipped from the factory with a shunt in this position. If there is no shunt on J3, the audio will not be sourced to the card's own output stage.

To expand in from another 5000 Series card, a shunt must be placed in the 'Exp In' (J1) position. If there is to be no expansion into the card, then a shunt must be placed in the 'Int In' (J1) position. The 4501NQ is shipped from the factory with a shunt in the 'Int In' (J1) position.





CHANNEL	JUMPER
1	J8
2	J9
3	J10
4	J11
Unbalanced Source Grounding Jumpers	

CHANNEL	JUMPER
1	J4
2	J5
3	J6
4	J7
Balanced/Unbalanced Source Gain Compensation Jumpers	

Figure 1 - 5401NQ Jumper and DIP Switch Locations

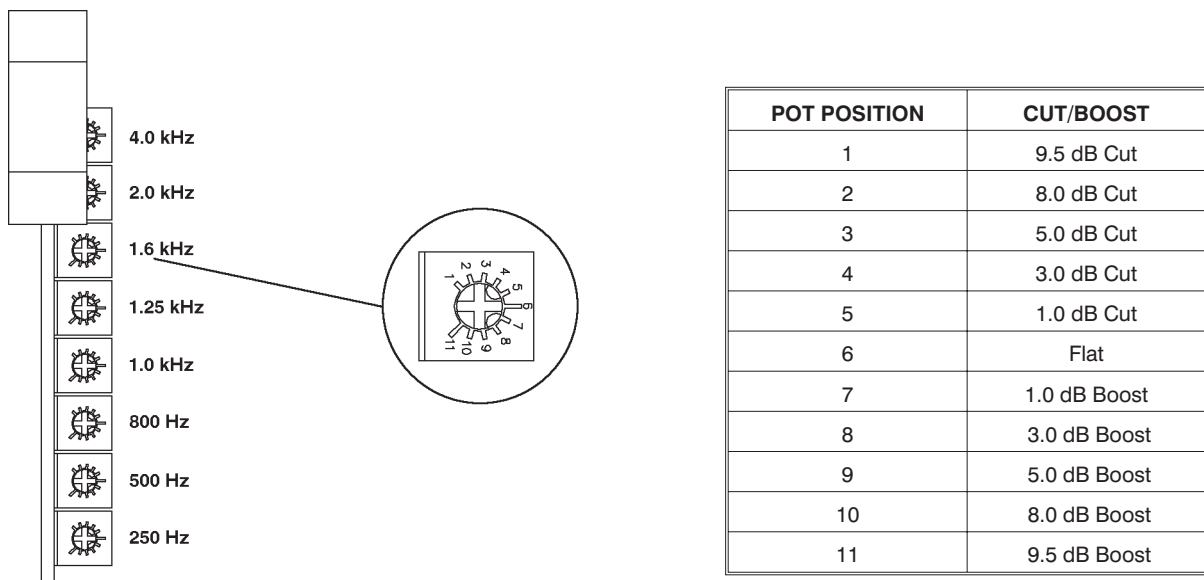


Figure 2 - 5401NQ EQ Pot Locations

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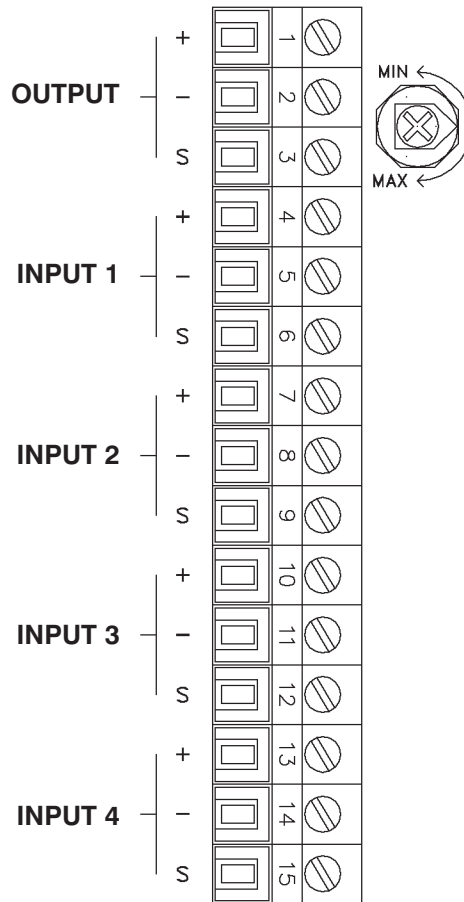


Figure 3 - 5032 Rear Panel Terminal Connections  
5401NQ, 5400NE

**NOTES:**

1. All trimpots are 10 kΩ.
2. Sources which are unbalanced can be connected with '+' side to '+' input and '-' side to '-' input. A jumper is provided to short the '-' input to ground on the card itself.
3. High sides of inputs or outputs are marked '+'. Low sides are marked '-'. Shield terminals are marked 'S', and are grounded on the mother board.
4. When connecting to the compression-type screw terminal connectors, use tinned stranded wire between 14 and 22 AWG. Be sure that all strands enter the terminal, so that there is no possibility of their shorting to an adjacent terminal. **DO NOT APPLY EXTRA TINNING!** Extra tinning can result in long term loosening of the connections, resulting in erratic operation and failure.
5. 5400NE is an expansion card and does not have output terminal connections or an output trimpot.



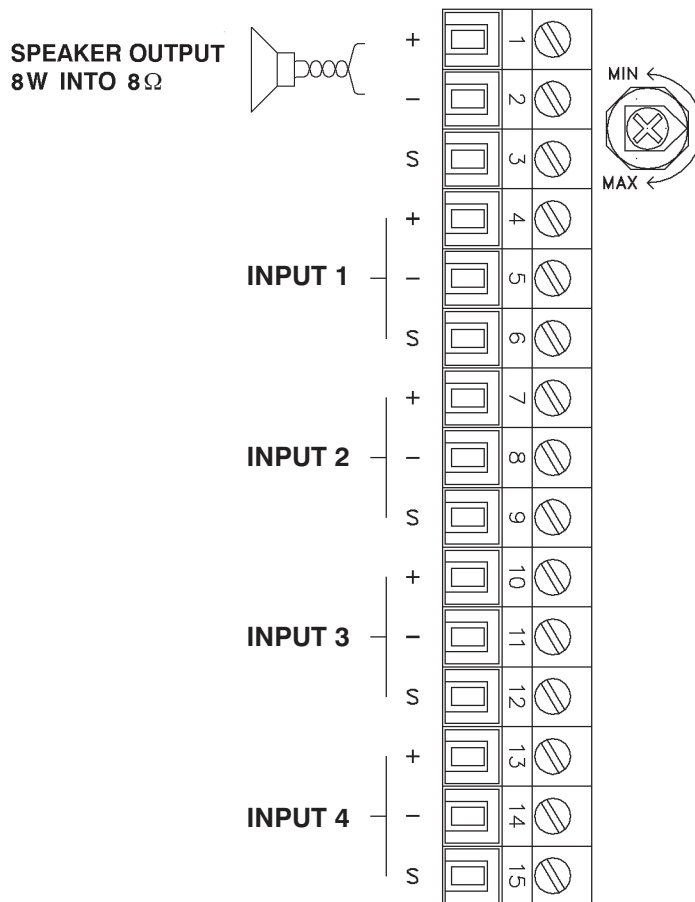


Figure 4 - 5032 Rear Panel Terminal Connections

**NOTES:**

1. All trimpots are 10 kΩ.
2. Sources which are unbalanced can be connected with '+' side to '+' input and '-' side to '-' input. A jumper is provided to short the '-' input to ground on the card itself.
3. High sides of inputs or outputs are marked '+'. Low sides are marked '-'. Shield terminals are marked 'S', and are grounded on the mother board.
4. When connecting to the compression-type screw terminal connectors, use tinned stranded wire between 14 and 22 AWG. Be sure that all strands enter the terminal, so that there is no possibility of their shorting to an adjacent terminal. **DO NOT APPLY EXTRA TINNING!** Extra tinning can result in long term loosening of the connections, resulting in erratic operation and failure.
5. Speakers are connected to terminals 1 and 2.

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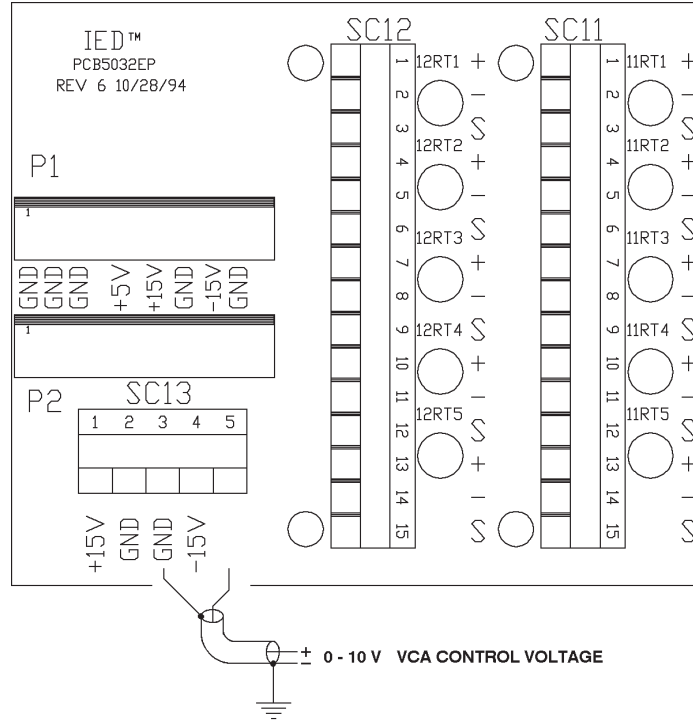


Figure 5 - 5401NQ Wiring  
VCA Control Voltage Connection on Rear of 5032EP Mainframe



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