

AUDIO AMPLIFIER-SPEAKER

12-Watt

Model NSN6027A

(For Model N1248A Converta-Com)

1. DESCRIPTION

The Model NSN6027A 12-Watt Audio Amplifier-Speaker provides an increased audio output level for high-noise level areas. It is designed for use with the MX300 and MT500 Series "Converta-Com" consoles. The user can adjust the audio level to that most suitable to override the surrounding noise level regardless of the volume setting on the portable radio in the "Converta-Com" console. The portable radio volume level can remain adjusted for best audio as needed when worn on the belt. There is no need to adjust and readjust the volume setting each time the radio is taken in and out of the vehicle.

The assembly consists of a audio amplifier circuit board, a weatherproof speaker, and a cable terminated in five contacts which are inserted into the "Converta-Com" console multiconductor plug. The plug is located on the rear of the console. The eight-ohm, five-inch speaker is capable of handling up to 12 watts of audio.

2. INSTALLATION

The audio amplifier-speaker includes a trunnion bracket, hanger bracket, and wall-mount bracket which permits the speaker to be mounted in a variety of ways. The trunnion bracket is a permanent mounting (dashboard and accessible firewall areas) for the speaker while permitting it to be tilted or angled for best results. The hanger bracket (already attached to the speaker) permits temporary mounting, such as on an automobile window. The speaker must be removed from the trunnion bracket to use the hanger bracket. The wall-mount bracket can be used for permanent mounting if the trunnion bracket is too large to fit in the desired area. In this instance, the trunnion bracket is removed and the speaker is attached to the wall-mount bracket by the hanger bracket.

Refer to Figure 1 for installation information. Perform the following procedures:

- Using the speaker trunnion bracket as a template, drill the necessary mounting holes and secure the bracket with the self-tapping screws provided.

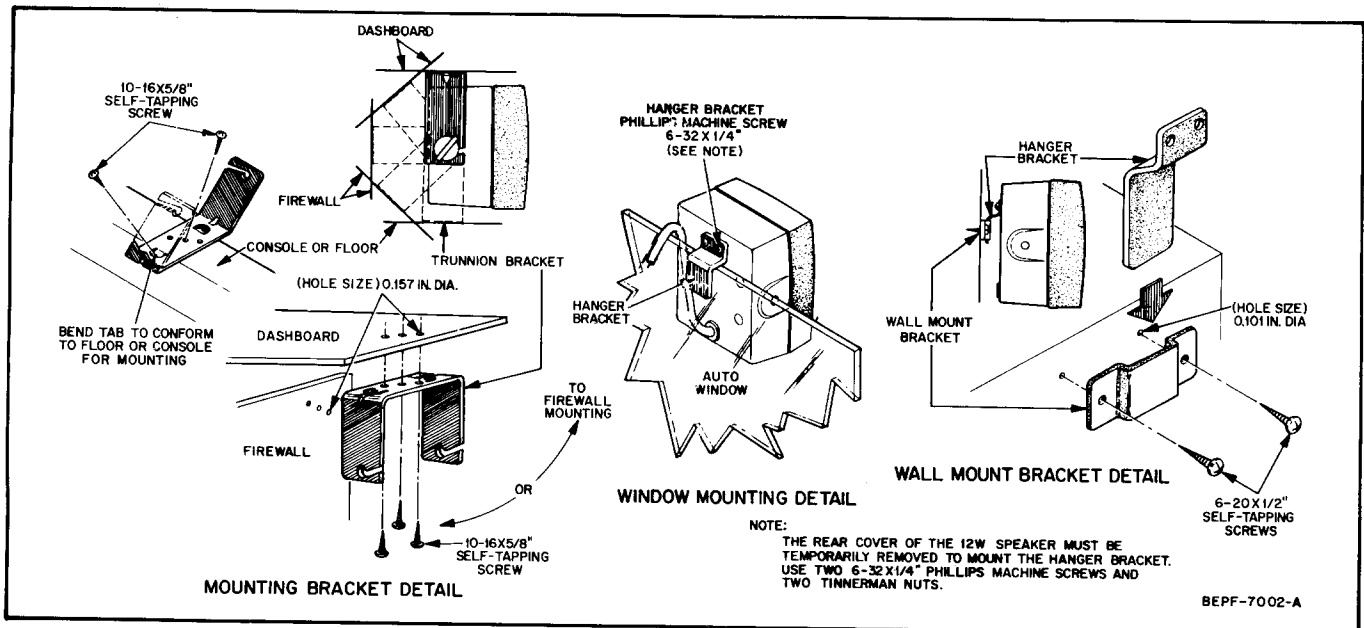


Figure 1. 12-Watt Audio Amplifier-Speaker Installation Detail



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ENGINEERING PUBLICATIONS

Communications Products Division

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b. Position the audio amplifier-speaker onto the trunnion bracket, and secure it using the wing screws supplied.

c. Remove the multiconductor cable plug from the "Converta-Com" console (P3) and connect the five contacts to the plug as designated in the following table.

| WIRE COLOR | TO |
|-------------|-------|
| Brown | P3-1 |
| Shield | P3-2 |
| Black-White | P3-3 |
| Green | P3-14 |
| Red-Yellow | P3-19 |

Also, add a jumper from P3-21 to P3-22 and a jumper from P3-2 to P3-3. If some of the contacts need to be relocated, refer to Figure 2 for instructions on contact removal and installation.

d. Reconnect the multiconductor plug back to the console.

3. CIRCUIT DESCRIPTION

The audio output of the "Converta-Com" console is amplified by the two halves of a 12-watt differential audio amplifier (U1A and U1B). After amplification, it is fed to the drivers; the U1A output is fed to Q4 and Q5, and the U1B output is fed to Q10 and Q11. These further amplify the

signal giving it more power gain. From there the audio signal is fed into final amplifiers Q6 and Q7, and Q8 and Q9, which drive the speaker.

The squelch input from the output of portable radio hybrid U8 is fed through R6 to the base of Q3. When the radio is squelched, the base of Q3 is low allowing Q3 to remain in the off condition. If Q3 is off, it disables integrated circuit U1, and through transistors Q2, Q1, Q13, and Q12 shuts off the rest of the power amplifier circuit so that a minimum of current is drawn. When the receiver unsquelches, U8 of the portable radio is on, the dc level on the squelch input rises turning on Q3 and enabling integrated circuit U1. Q3 also enables Q1, Q2, Q12, and Q13 to bias the remaining circuitry up to its normal operating condition to amplify the incoming audio signal.

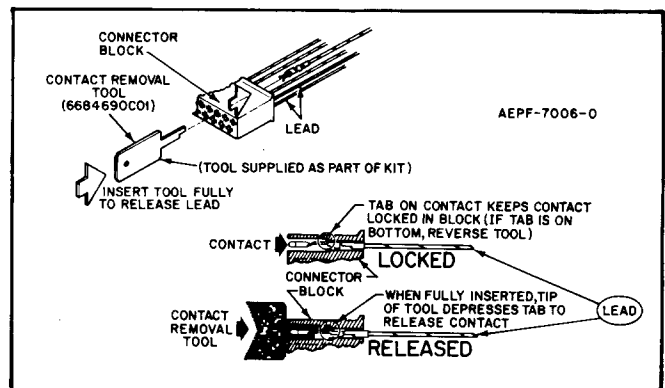
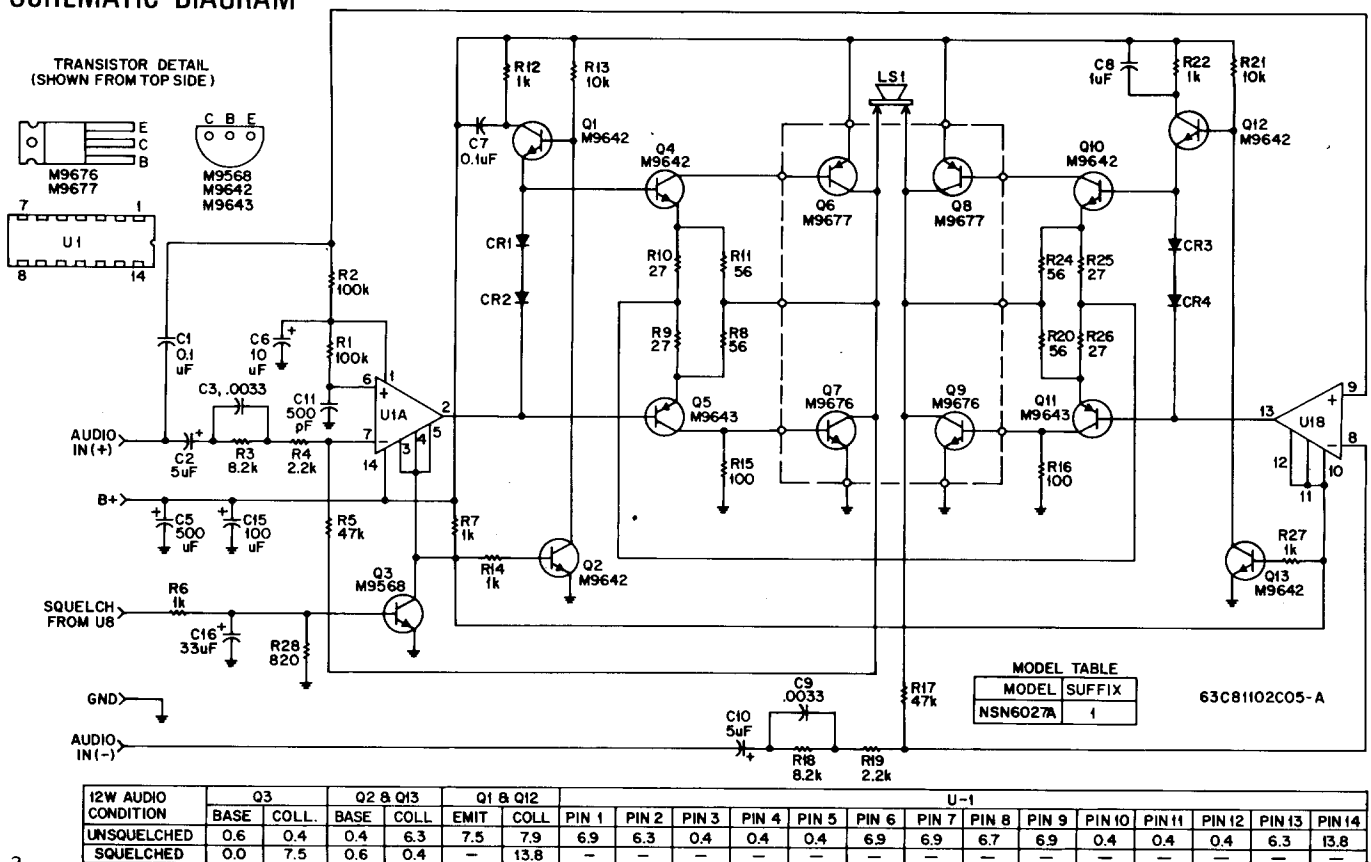
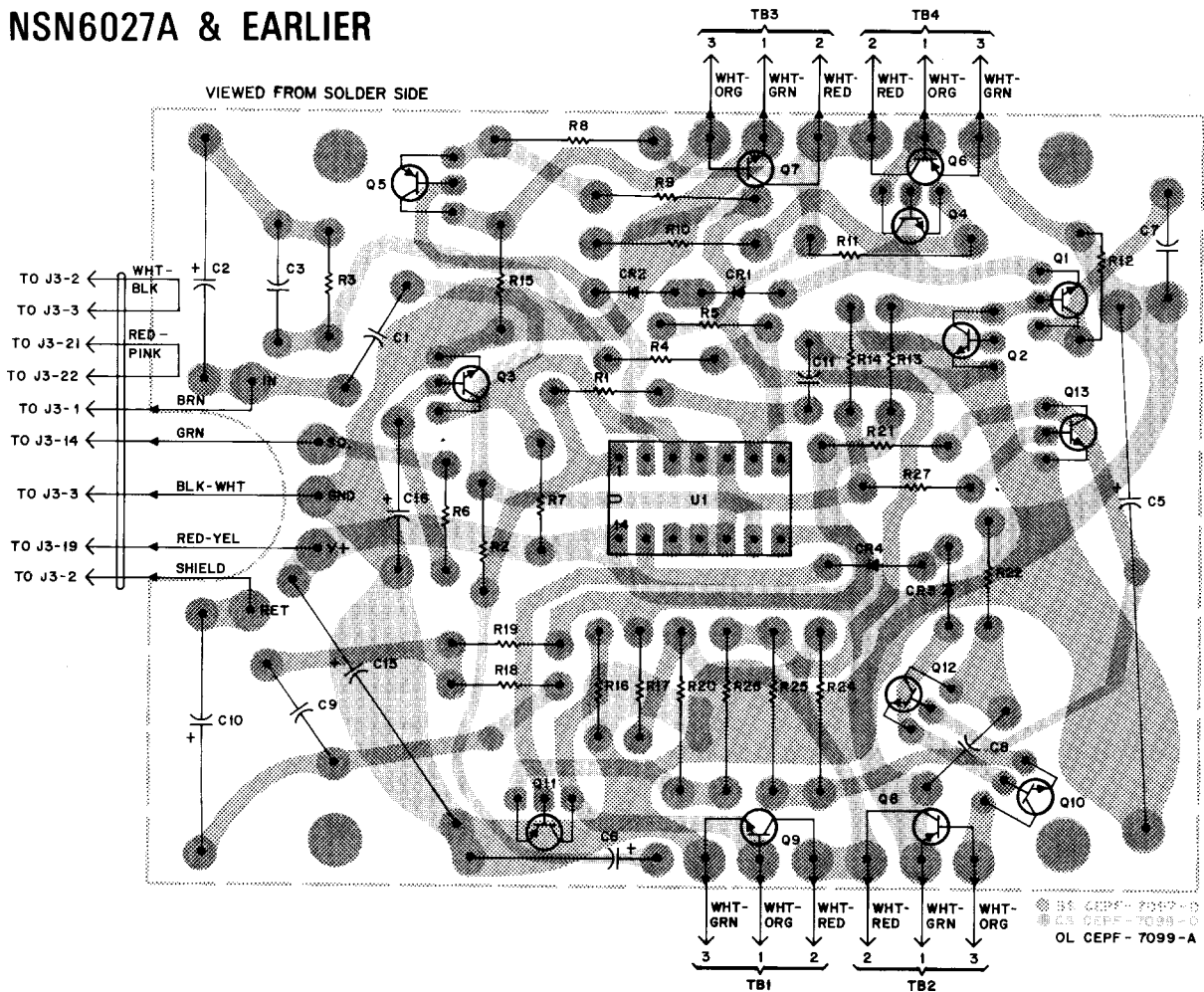


Figure 2. Contact Removal and Installation

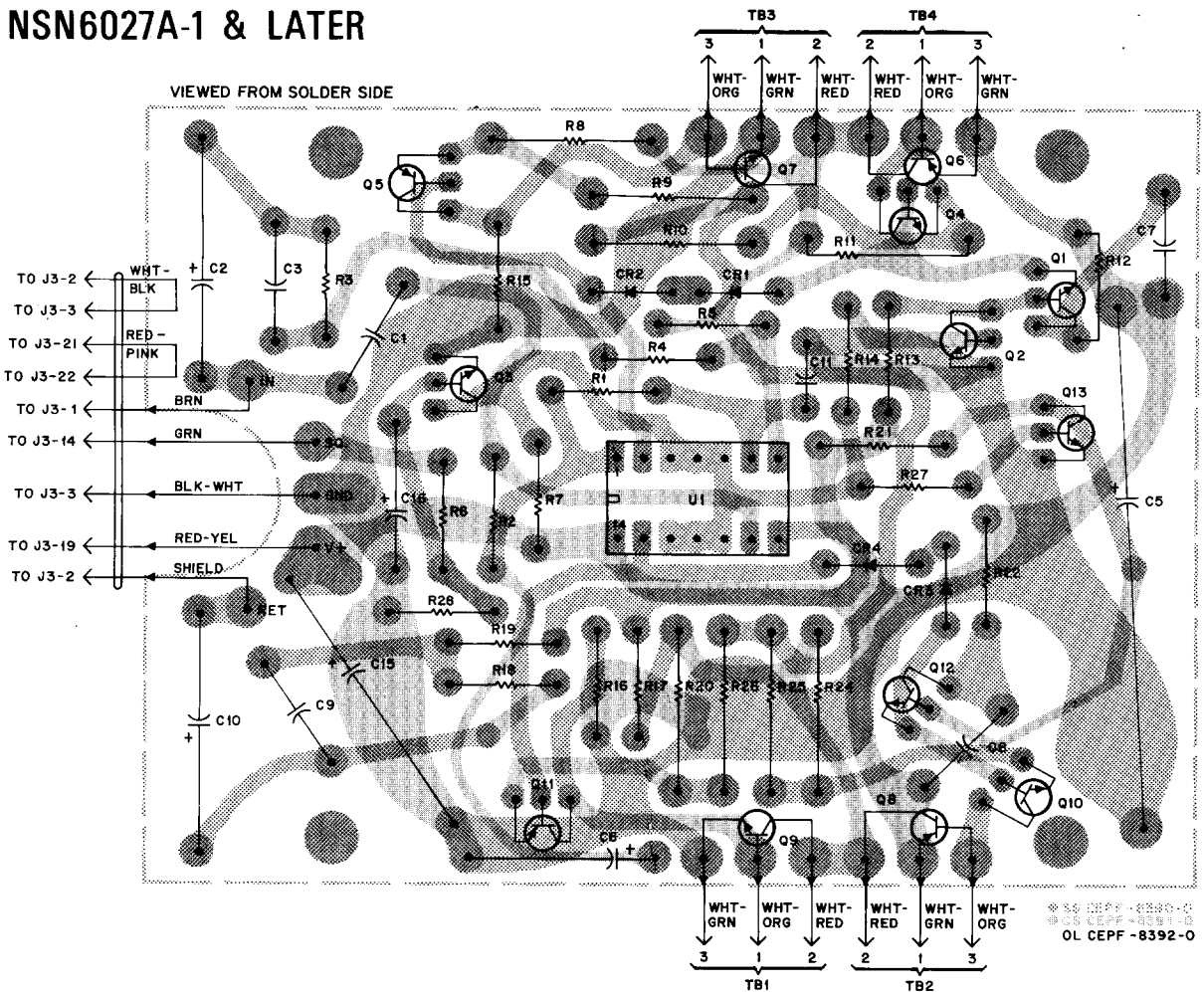
SCHEMATIC DIAGRAM



NSN6027A & EARLIER



NSN6027A-1 & LATER



| REFERENCE SYMBOL | MOTOROLA PART NO. | DESCRIPTION |
|------------------|-------------------|--|
| | | <u>CAPACITOR, Fixed: μF $\pm 10\%$</u> |
| | | 25 V unless stated |
| C1 | 0882096J18 | 0.1; 250 V |
| C2 | 2382601A11 | 5-10 + 33% |
| C3 | 0882096J25 | .0033; 50 V |
| C5 | 2383210A19 | 500-10+100 |
| C6 | 2382256J03 | 10-10+50% |
| C7, 8 | 0882905G07 | 0.1; 50 V |
| C9 | 0882096J25 | .0033; 250 V |
| C10 | 2382601A11 | 5-10+33% |
| C11 | 2183162H08 | 500 pF; 100 V |
| C15 | 2382783B04 | 100 |
| C16 | 2383397D25 | 33 $\pm 20\%$; 2V |
| CR1 thru 4 | 4883654H01 | <u>DIODE</u> ; See Note Silicon |
| LS1 | 5084561B02 | <u>SPEAKER</u> ; 5" Permanent Magnet |
| | | <u>TRANSISTOR</u> ; See Note |
| Q1, 2 | 4800869642 | NPN; type M9642 |
| Q3 | 4800869568 | NPN; type M9568 |
| Q4 | 4800869642 | NPN; type M9642 |
| Q5 | 4800869643 | PNP; type M9643 |
| Q6 | 4800869677 | PNP; type M9677 |
| Q7 | 4800869676 | NPN; type M9676 |
| Q8 | 4800869677 | PNP; type M9677 |
| Q9 | 4800869676 | NPN; type M9676 |
| Q10 | 4800869642 | NPN; type M9642 |
| Q11 | 4800869643 | PNP; type M9643 |
| Q12, 13 | 4800869642 | NPN; type M9642 |
| | | <u>RESISTOR, Fixed: Ω $\pm 5\%$</u> |
| | | 1/4 W unless stated |
| R1, 2 | 0600124A97 | 100 k |
| R3 | 0600124A71 | 8.2 k |
| R4 | 0600124A57 | 2.2 k |
| R5 | 0600124A89 | 47 k |
| R6 | 0600124C49 | 1k $\pm 10\%$ |
| R7 | 0600124C49 | 1 k $\pm 10\%$ |
| R8 | 0600125A19 | 56; 1/2 W |
| R9, 10 | 0600125A11 | 27; 1/2 W |
| R11 | 0600125A19 | 56; 1/2 W |
| R12 | 0600124C49 | 1 k $\pm 10\%$ |
| R13 | 0600124C73 | 10 k $\pm 10\%$ |
| R14 | 0600124C49 | 1 k $\pm 10\%$ |
| R15, 16 | 0600124C25 | 100 $\pm 10\%$ |
| R17 | 0600124A89 | 47 k |
| R18 | 0600124A71 | 8.2 k |
| R19 | 0600124A57 | 2.2 k |
| R20 | 0600125A19 | 56; 1/2 W |
| R21 | 0600124C73 | 10 k $\pm 10\%$ |
| R22 | 0600124C49 | 1 k $\pm 10\%$ |
| R24 | 0600125A19 | 56; 1/2 W |
| R25, 26 | 0600125A11 | 27; 1/2 W |
| R27 | 0600124C49 | 1 k $\pm 10\%$ |
| R28 | 0600124C47 | 820 $\pm 10\%$ |
| U1 | 5184320A99 | <u>INTEGRATED CIRCUIT</u> ; Dual Operational Amplifier |

| NONREFERENCED ITEMS | | |
|---------------------|------------|--|
| | 6405739D01 | PLATE, Serial |
| | 1305178E01 | BEZEL, Speaker |
| | 3284564B01 | GASKET, Speaker |
| | 4200850861 | STRAIN RELIEF |
| | 0705152E01 | BRACKET, Trunnion |
| | 1505919D01 | COVER, Rear |
| | 0705155E01 | BRACKET, Hanger |
| | 0784569B01 | BRACKET, Wall Mounting |
| | 4200867839 | STRAIN Relief |
| | 4200893464 | S-Hook |
| | 0984151B03 | CONNECTOR, Receptacle Pin (3 req'd) |
| | 0984151B06 | CONNECTOR, Receptacle Pin (2 req'd) |
| | 3083560A02 | CABLE, 6-conductor |
| | 0705712C01 | BRACKET, Enclosure Mounting |
| | 0705920D01 | BRACKET, Mounting |
| | 3100135201 | TERMINAL STRIP |
| | 0384244C01 | THUMB SCREW |
| | 1405536E01 | INSULATOR (for Q6, Q7, Q8, Q9) |

NOTE: For optimum performance, order replacement diodes and transistors by Motorola part number only.

REVISIONS

| BOARD AND SUFFIX NO. | REFERENCE SYMBOL | CHANGE |
|----------------------|------------------|--|
| NSN6027A | C3, 9 | WAS 0882096J01; .0033 μ F; 50 V |
| | C15 | WAS 2383397D25; 68 μ F $\pm 20\%$; 2 V |
| | R28 | ADD 0600124C47; 820 Ω $\pm 10\%$ |
| NSN6027A-1 | | ADD 1405536E01; INSULATOR (for Q6, Q7, Q8, Q9) |
| | | As Shown |



MOTOROLA

MX300/MT500 SERIES

"Converta-Com" Consoles 12-W Audio Amplifier-Speaker

1. DESCRIPTION

The Model NSN6027A 12-Watt Audio Amplifier-Speaker provides an increased audio output level for high-noise level areas. It is designed for use with the MX300 and MT500 Series "Converta-Com" consoles. The user can adjust the audio level to that most suitable to override the surrounding noise level regardless of the volume setting on the portable radio in the "Converta-Com" console. The portable radio volume level can remain adjusted for best audio as needed when worn on the belt. There is no need to adjust and readjust the volume setting each time the radio is taken in and out of the vehicle.

The assembly consists of an audio amplifier circuit board, a weatherproof speaker, and a cable terminated in five contacts which are inserted into the "Converta-Com" console multiconductor plug. For additional information refer to the appropriate console interconnecting and intercabling detail in the "Converta-Com" instruction manual. The plug is located on the rear of the console. The 3.2Ω, five-inch speaker is capable of handling up to 12 watts of audio.

2. INSTALLATION

The audio amplifier-speaker includes a trunnion bracket,

hanger bracket, and wall-mount bracket which permits the speaker to be mounted in a variety of ways. The trunnion bracket is used to permanently mount the speaker to the dashboard or accessible firewall areas, while permitting the speaker to be tilted or angled. The hanger bracket (already attached to the speaker) permits temporary mounting, such as on an automobile window. The speaker must be removed from the trunnion bracket to use the hanger bracket. The wall-mount bracket can be used for permanent mounting if the trunnion bracket is too large to fit in the desired area. In this instance, the trunnion bracket is removed and the speaker is attached to the wall-mount bracket by the hanger bracket.

Refer to Figure 1 for installation information. Perform the following procedures:

- Using the speaker trunnion bracket as a template, drill the necessary mounting holes and secure the bracket with the self-tapping screws provided.
- Position the audio amplifier-speaker onto the trunnion bracket, and secure it using the wing screws supplied.
- Remove the multiconductor cable plug from the

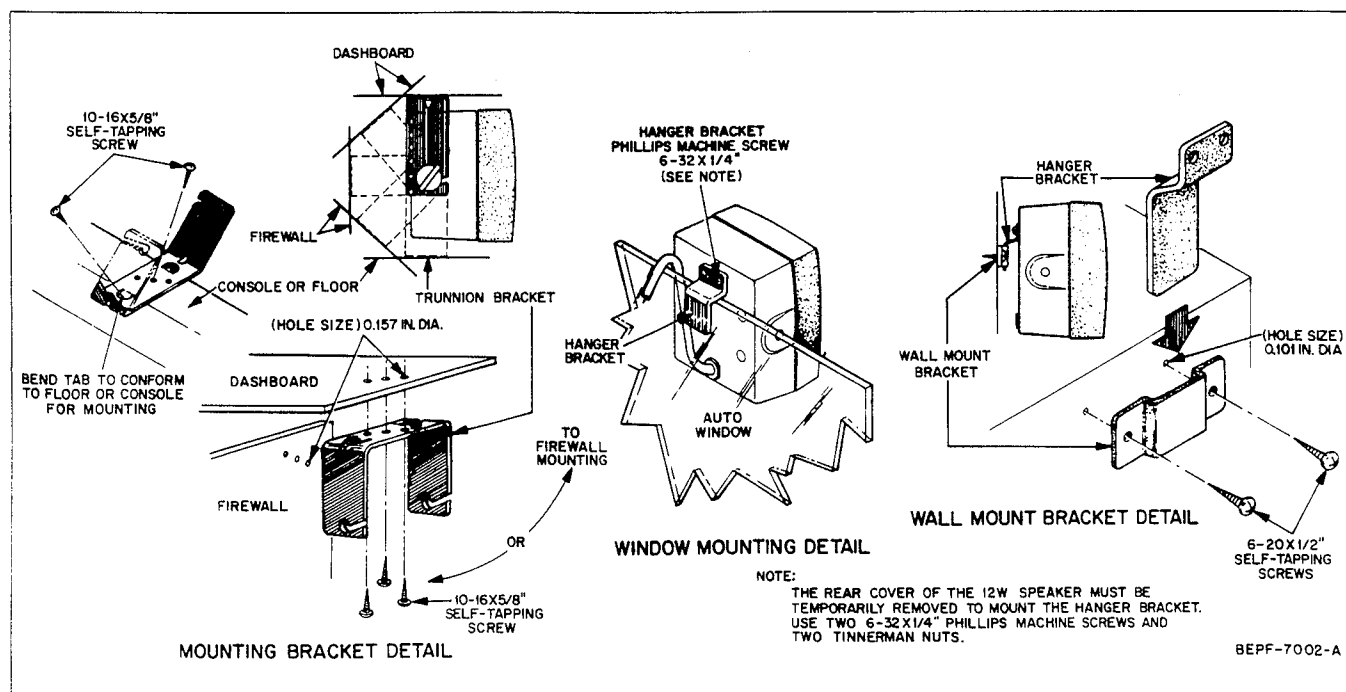
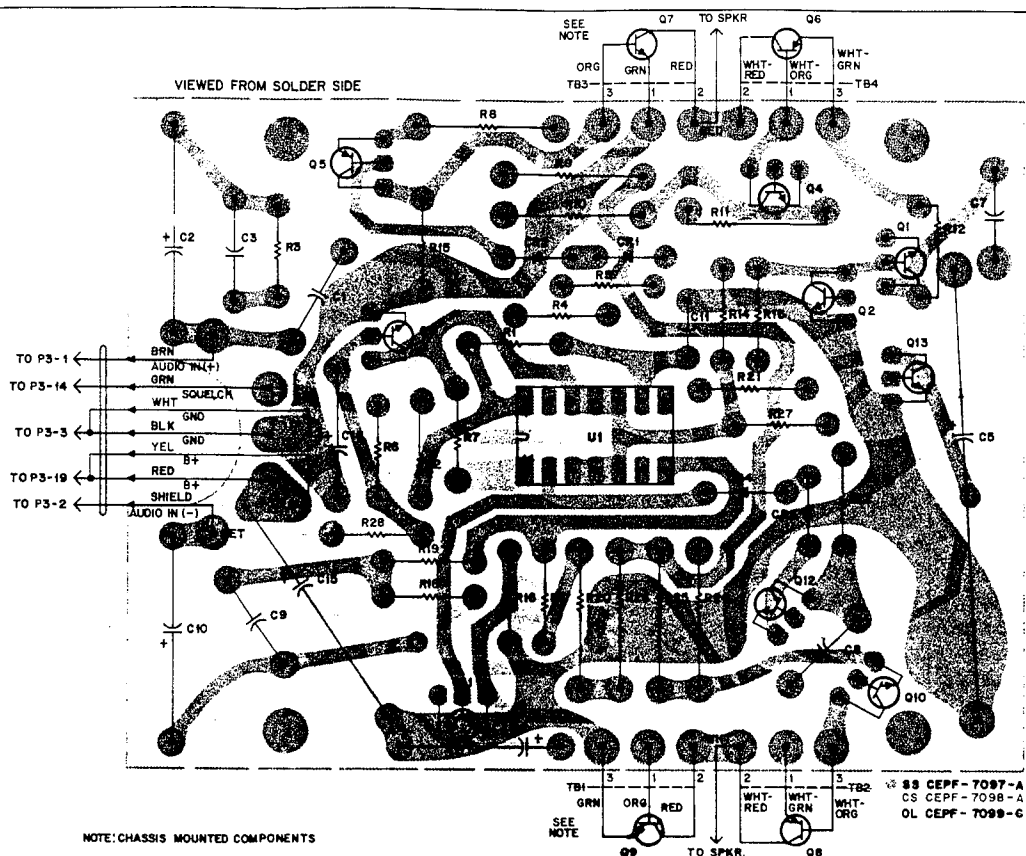
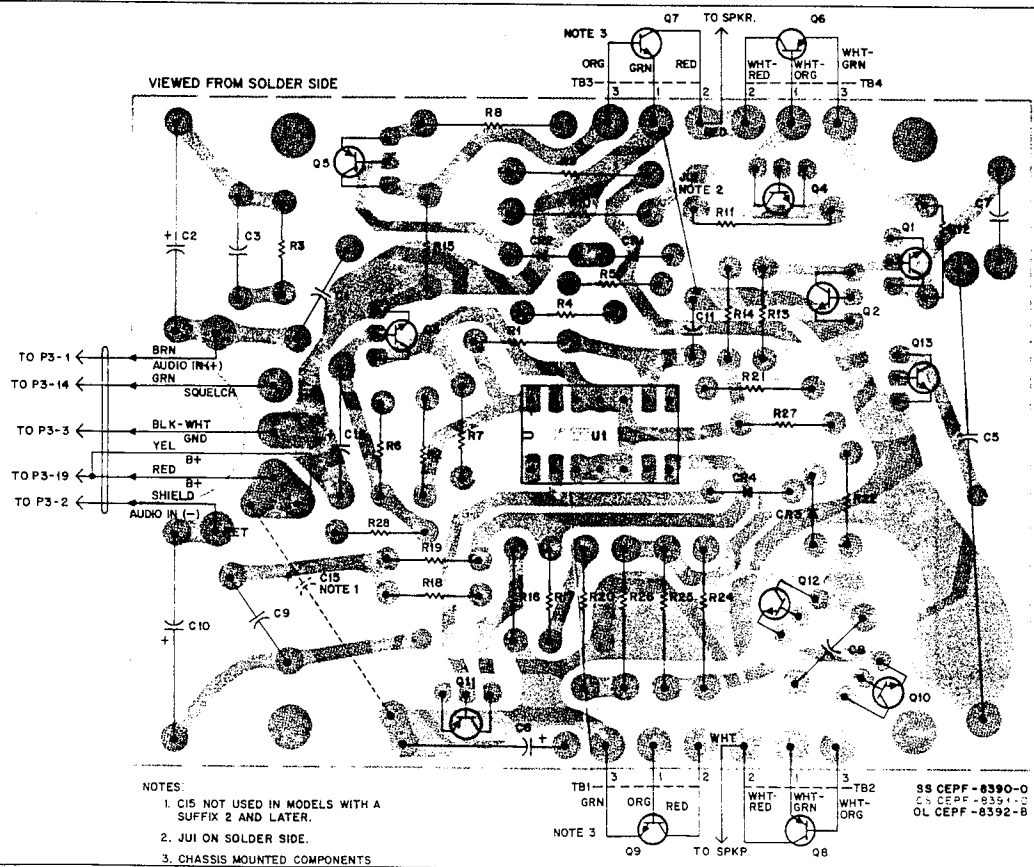


Figure 1. 12-Watt Audio Amplifier-Speaker Installation Detail

NLN6027A



NSN6027A-1 & LATER



| REFERENCE SYMBOL | MOTOROLA PART NO. | DESCRIPTION |
|------------------|-------------------|--|
| | | CAPACITOR, Fixed: $\mu\text{F} \pm 10\%$; 25 V unless stated |
| C1 | 0882905G07 | 0.1; 63 V |
| C2 | 2382601A11 | 5 - 10 + 33% |
| C3 | 0882096J25 | .0033; 50 V |
| C5 | 2383210A19 | 500 - 10 + 100 |
| C6 | 2382256J03 | 10 - 10 + 50% |
| C7, 8 | 0882905G07 | 0.1; 50 V |
| C9 | 0882096J25 | .0033; 250 V |
| C10 | 2382601A11 | 5 - 10 + 33% |
| C11 | 2183162H08 | 500 pF; 100 V |
| C16 | 2383397D25 | 33 $\pm 20\%$; 2 V |
| CR1 thru 4 | 4883654H01 | DIODE: See Note Silicon |
| LS1 | 5084561B02 | SPEAKER: 5" PM, 3.2 Ω |
| | | TRANSISTOR: See Note |
| Q1, 2 | 4800869642 | NPN; type M9642 |
| Q3 | 4800869568 | NPN; type M9568 |
| Q4 | 4800869642 | NPN; type M9642 |
| Q5 | 4800869643 | PNP; type M9643 |
| Q6 | 4800869677 | PNP; type M9677 |
| Q7 | 4800869676 | NPN; type M9676 |
| Q8 | 4800869677 | PNP; type M9677 |
| Q9 | 4800869676 | NPN; type M9676 |
| Q10 | 4800869642 | NPN; type M9642 |
| Q11 | 4800869643 | PNP; type M9643 |
| Q12, 13 | 4800869642 | NPN; type M9642 |
| | | RESISTOR, Fixed: $\Omega \pm 5\%$; $\frac{1}{4}\text{W}$ unless stated |
| R1, 2 | 0611009C97 | 100k |
| R3 | 0611009C71 | 8.2k |
| R4 | 0611009C57 | 2.2k |
| R5 | 0611009C89 | 47k |
| R6, 7 | 0611009C49 | 1k |
| R8 | 0600125A19 | 56; $\pm 10\%$; $\frac{1}{2}\text{W}$ |
| R9, 10 | 0600125A11 | 27; $\pm 10\%$; $\frac{1}{2}\text{W}$ |
| R11 | 0600125A19 | 56; $\pm 10\%$; $\frac{1}{2}\text{W}$ |
| R12 | 0611009C49 | 1k |
| R13 | 0611009C73 | 10k |
| R14 | 0611009C49 | 1k |
| R15, 16 | 0611009C25 | 100 |
| R17 | 0611009C89 | 47k |
| R18 | 0611009C71 | 8.2k |
| R19 | 0611009C57 | 2.2k |
| R20 | 0600125A19 | 56; $\pm 10\%$; $\frac{1}{2}\text{W}$ |
| R21 | 0611009C73 | 10k |
| R22 | 0611009C49 | 1k |
| R24 | 0600125A19 | 56; $\pm 10\%$; $\frac{1}{2}\text{W}$ |
| R25, 26 | 0600125A11 | 27; $\pm 10\%$; $\frac{1}{2}\text{W}$ |
| R27 | 0611009C49 | 1k |
| R28 | 0611009C47 | 820 |
| U1 | 5184320A99 | INTEGRATED CIRCUIT: Dual Operational Amplifier |

| NONREFERENCED ITEMS | | |
|---------------------|-------------------------------------|--|
| 6405739D01 | PLATE, Serial | |
| 1305178E01 | BEZEL, Speaker | |
| 3284564B01 | GASKET, Speaker | |
| 4200850861 | STRAIN RELIEF | |
| 0705152E01 | BRACKET, Trunnion | |
| 1505919D01 | COVER, Rear | |
| 0705155E01 | BRACKET, Hanger | |
| 0784569B01 | BRACKET, Wall Mounting | |
| 4200867839 | STRAIN RELIEF | |
| 4200893464 | S-Hook | |
| 0984151B03 | CONNECTOR, Receptacle Pin (3 req'd) | |
| 0984151B06 | CONNECTOR, Receptacle Pin (2 req'd) | |
| 3083560A02 | CABLE, 6-conductor | |
| 0705712C01 | BRACKET, Enclosure Mounting | |
| 0705920D01 | BRACKET, Mounting | |
| 3100135201 | TERMINAL STRIP | |
| 0384244C01 | THUMB SCREW | |
| 1405536E01 | INSULATOR (for Q6, 7, 8, 9) | |

NOTE: For optimum performance, order replacement diodes and transistors by Motorola part number only.

Back-Dating Information

| BOARD AND SUFFIX NO. | REFERENCE SYMBOL | CHANGE |
|----------------------|---------------------|---|
| NSN6027A | C3, 9 C15 R28 | WAS 0882096J01; .0033 μF ; 50 V WAS 2383397D25, $\pm 8\mu\text{F} \pm 20\%$; 2 V ADD 0600124C47; 820 $\Omega \pm 10\%$ ADD 1405536E01; INSULATOR (for Q6, 7, 8, 9) |
| NSN6027A-1 | C15 Jumper | DELETED 2382783B04; 100 ADD from Q7 emitter to ground |
| NSN6027A | | AS SHOWN |

**MOTOROLA****MANUAL REVISION**

for

Manual No. 68P81102C04-C

MX300/MT500 SERIES

"Converta-Com" Consoles

12-W Audio Amplifier-Speaker

This revision outlines changes that have occurred since the printing of your manual. Use this information to supplement your manual. Installation of these changes in earlier equipment is not necessary except as recommended in Motorola Service and Repair Notes (SRN's).

REVISION DETAILS

| <u>NO.</u> | <u>CHANGE AFFECTS</u> | <u>ITEM NO.</u> | <u>SUFFIX</u> |
|------------|-----------------------|-----------------|---------------|
| 1 | Parts List | NSN6027A | 3 |

CHANGES

| <u>NO.</u> | <u>REF. SYM.</u> | <u>ACTION</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> |
|------------|------------------|---------------|-----------------|---------------------------------------|
| 1 | C2, 10 | changed to | 2382256J04 | CAPACITOR, Fixed: uF 1-10+50; 100V |
| | C16 | changed to | 2382256J03 | 10-10+50; 25V |
| | R28 | changed to | 0611009C73 | RESISTOR, Fixed: Ω 10k |