

FIELD ADVISORY

FA#95-005 Revised
May 31, 1995

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IT IS NOT A NOTICE OF WARRANTY AUTHORIZATION

TO: ALL LAND MOBILE SERVICE CENTERS
ATTENTION: SERVICE MANAGER

SUBJECT: Replacing U601 On 86XX Mobile Radios

This is a revision to FA95-005 dated April 4, 1995 and FA95-005 Revised, dated April 25, 1995. Please note that the part number of R618 was incorrectly listed as 569-0115-102 on the original document. It should be 569-0115-103. Please replace the old documents with this one.

The original op-amp used for U601 (PN 544-2019-001) in the 86XX series radios will soon be no longer available. Should U601 need to be replaced, use part number 544-2019-003.

When replacing the older op-amp with the new, some circuit changes are required. These changes vary depending on the radio model number and the revision of the radio main PC board. The main change is the addition of 10K Ω pull-down resistors on the outputs of the op-amp (pins 1 & 7).

8600/8601/8602/8604/8622/8625/8640/8644

NEWER MAIN RADIO PC BOARD

New version main radio PC boards incorporate the 10K Ω pull-down resistors on the board layout. This newer board has a 10K Ω chip resistor (R619) located near pin 8 of U601 (pin 7 pull-down resistor) and a 10K Ω chip resistor (R618) located near pin 4 of U601 (pin 1 pull-down resistor). If these resistors are present on the main PC board, then the replacement device can be installed with no further modification necessary. For more details on the layout differences in the U601 area between the newer and older main PC board, see figures 1 and 2 on the last page.

The following describes approximately when the various radio models came out with the newer version main PC board.

<u>Model #</u>	<u>Approximate Build Date</u>
8600	Early to mid July, 1994
8602/8622/8625	Middle of November, 1994
8640	Middle of August, 1994

OLDER MAIN RADIO PC BOARD

If the 10K Ω resistors (R618 & R619) described in the previous paragraph are not present on the board layout (see figure 2 on the last page), then the main radio PC board is an older version. When changing U601 to a device with a part number of 544-2019-003 on an older version board, an add-on 10K Ω chip resistor (*pn 569-0115-103*) will need to be installed on the bottom side from pin 4 of U601 to the adjacent trace that goes to pin 7 of U601. This 10K Ω resistor is used as the pull-down resistor (R619) for the output of the second stage of U601. To install this resistor, it will be necessary to scrape away some of the green solder resist on the trace that is going to pin 7 before it will be possible to solder both ends of the chip resistor. The resistor will need to be installed at an angle. See figure 1 on the last page for more details on the proper placement of R619.

8605/8606/8610/8615/8616/8620/8621/8655

Like the previously described radios, the version of the main PC board determines whether or not pull down resistors need to be added. When replacing U601, the following points must be observed for both the newer and older main boards:

1. If the replacement op-amp has a part number of 544-2019-003 and **does not** have a Motorola® vendor marking, two 33pf chip capacitors (pn 510-3601-330) will need to be installed on the bottom of the main PC board. Install one between pins 2 and 3 of U601 and install the other between pins 5 and 6 of U601.
2. Additionally, this new configuration requires that bypass capacitor C605 (pn 510-3602-560) be relocated from its original position to a location closer to U601. One side of C605 should be soldered to pin 5 of U601 and the other to the ground side of C608.

For more details on the layout differences between the newer and older main PC board and the location of the chip capacitors, see the figures on the last page.

NEWER MAIN RADIO PC BOARD (All Except 8655)

All above listed radio models with a build date of early July, 1994 or later, will likely have the newer main PC board. These newer boards incorporate the 10K Ω pull down resistors on the board layout. The newer board has a 10K Ω chip resistor (R619) located near R610 and R609. R619 is the pull-down resistor for U601 pin 7. Another 10K Ω chip resistor, R618, is located near pin 4 of U601. R618 is the pull-down resistor for U601 pin 1. If these resistors are present on the main PC board, then the replacement device can be installed without the need of installing pull-down resistors.

OLDER MAIN RADIO PC BOARD (All Except 8655)

If the 10K Ω resistors (R618 & R619) described in the previous paragraph are not present on the main PC board layout (see figure 4 on the last page), then the board is an older version. When changing U601 to a device with a part number of 544-2019-003 on an older board, an add-on 10K Ω chip resistor will need to be installed on the bottom side from pin 4 of U601 to the adjacent trace that goes to pin 7 of U601. This 10K Ω resistor is used as the pull-down (R619) for the output of the second stage of U601. To install this resistor, it will be necessary to scrape away some of the green solder resist on the trace that is going to pin 7 before it will be possible to solder both ends of the chip resistor. The resistor will need to be installed at an angle.

NEWER MAIN RADIO PC BOARD (8655 Only)

All 8655 model radios with a build date of early July, 1994 or later, will likely have the newer main PC board. These newer boards incorporate the 10K Ω pull down resistors on the board layout. The newer board has a 10K Ω chip resistor (R619) located at an angle near pin 4 of U601. R619 is the pull-down resistor for U601 pin 7. Another 10K Ω chip resistor, R618, is located near pin 1 of U601 (and directly parallel to R612). R618 is the pull-down resistor for U601 pin 1. If these resistors are present on the main PC board, then the replacement device can be installed without the need of installing pull-down resistors.

OLDER MAIN RADIO PC BOARD (8655 Only)

If the 10K Ω resistors (R618 & R619) described in the previous paragraph are not present on the main PC board layout (see figure 6 on the last page), then the board is an older version. When changing U601 to a device with a part number of 544-2019-003 on the older board, an add-on 10K Ω chip resistor will need to be installed on the bottom side from pin 4 of U601 to the adjacent trace that goes to pin 7 of U601. This 10K Ω resistor is used as the pull-down (R619) for the output of the second stage of U601. To install this resistor, it will be necessary to scrape away some of the green solder resist on the trace that is going to pin 7 before it will be possible to solder both ends of the chip resistor. The resistor will need to be installed at an angle.

R618 On Older Boards

While pull down resistors are desired on the outputs of the newer op-amp, R618 (pull-down resistor for pin 1 to ground) is not included as part of the modification of the older main PC boards. The addition of this resistor is not as critical as the addition of R619. Because of the lack of a convenient placement location, this resistor is not included in the modification but is included on the layout of the new version boards.

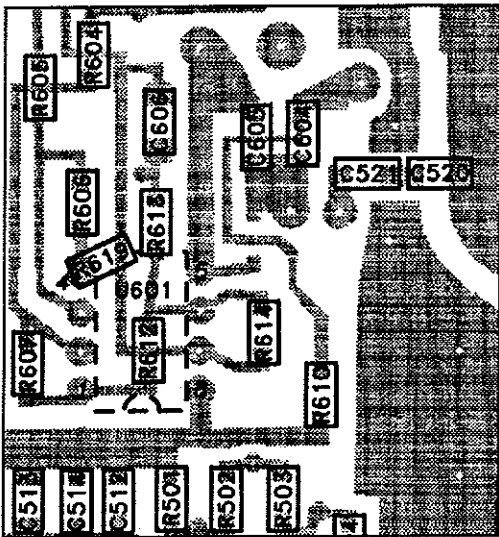
Potential Problems

Listed below are the potential problems that will arise if all the modification steps listed in this advisory are not followed.

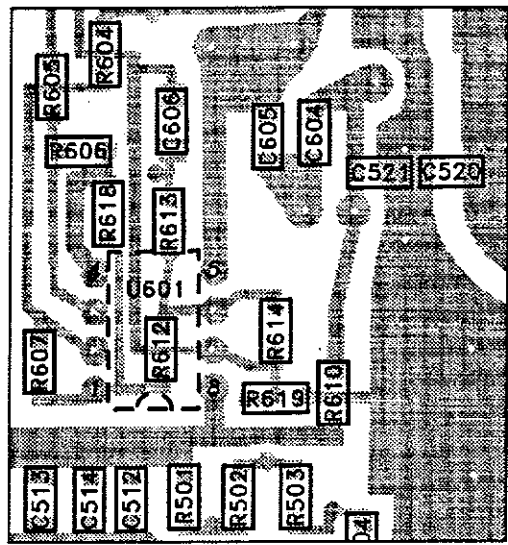
- 1. R619 pull-down resistor** - If the R619 pull-down resistor is not installed when a replacement op-amp with the part number 544-2019-003 is used, the output of U601B will not go completely low causing the power control circuit to be partly turned on in receive mode. This can cause an extra drain on the vehicle battery. This is true for all 86XX radios
- 2. 33pf capacitors** - If the 33pf chip capacitors are not installed between pins 2 and 3 and between pins 5 and 6 of U601 when U601 has been replaced with a device with a part number of 544-2019-003 that **does not** have a Motorola vendor marking, a potential power slump can occur at colder temperatures. This is only true for the 8605/8606/8610/8615/8616/8620/8621/8655 mobiles. It is not true for the 8600/8601/8602/8604/8622/8625/8644 mobiles.
- 3. Moving C605** - If C605 is not relocated when using a device for U601 with a part number 544-2019-003, a power change of 3 to 8 watts can occur when the covers are put on. This only applies to the 8605/8606/8610/8615/8616/8620/8621/8655 mobiles. It does not apply to the 8600/8601/8602/8604/8622/8625/8644 mobiles.
- 4. Installing C605 in the new location without removing the old one** - If a 56 pf capacitor is installed in the new C506 location without removing the one from the original C506 position, a potential spurious problem will result.

It should be noted that this field advisory addresses what is required should U601 need to be replaced. There is no known reliability problem with U601. This is purely an instruction procedure issued due to the fact that the device with the part number 544-2019-001 will be no longer available.

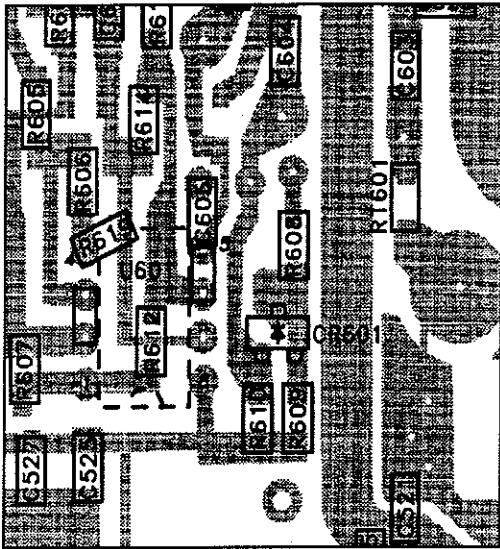
For technical questions regarding this field advisory, call 1-800-328-3911, ext. 2.



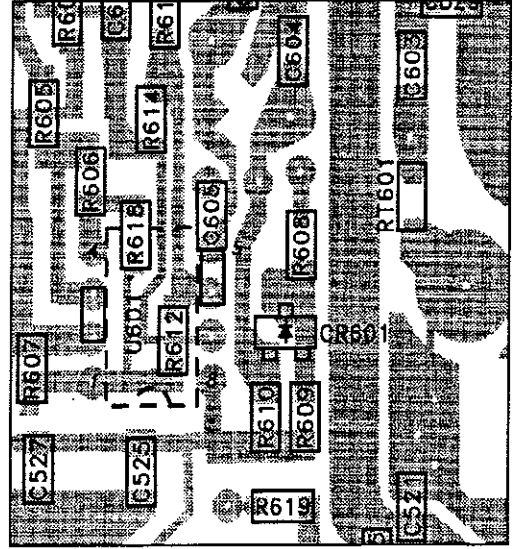
Older 8600/01/02/04/22/25/40/44 U601 Board Layout
R619 Soldered From Pin 4 U601 to Nearby Trace
Figure 1



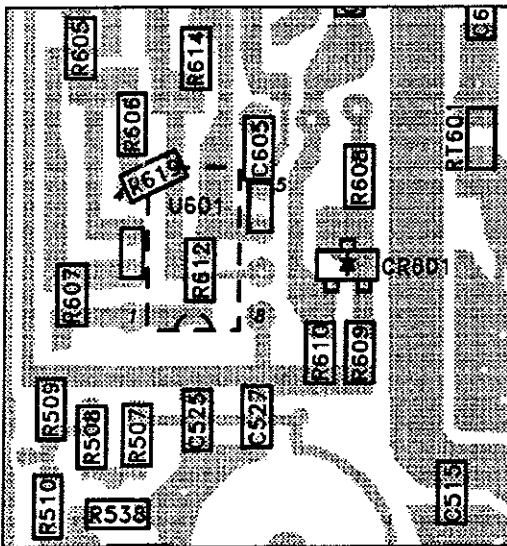
Newer 8600/01/02/04/22/25/40/44 U601 Board Layout
R618 & R619 are laid out on the board
Figure 2



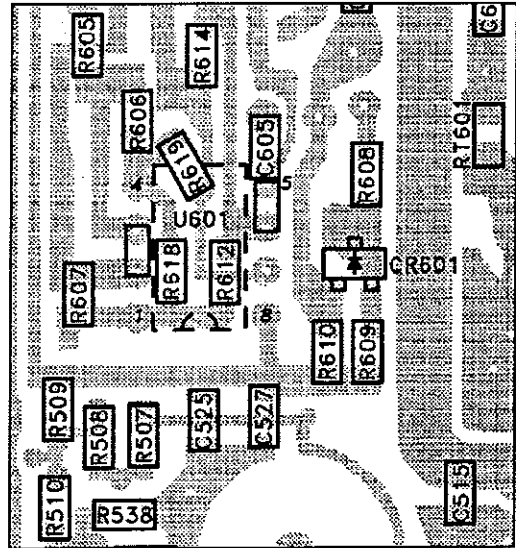
Older 8605/06/10/15/16/20/21 U601 Board Layout
R619 Soldered From Pin 4 U601 to Nearby Trace
33 pf chip caps. added as required from pins 2 to 3 and pins 5 to 6
C605 shown in its new location coming off pin 5 of U601
Figure 3



Newer 8605/06/10/15/16/20/21 U601 Board Layout
R618 & R619 are laid out on the board
33 pf chip caps. added as required from pins 2 to 3 and pins 5 to 6
C605 shown in its new location coming off pin 5 of U601
Figure 4



Older 8655 U601 Board Layout
R619 Soldered From Pin 4 U601 to Nearby Trace
33 pf chip caps. added as required from pins 2 to 3 and pins 5 to 6
C605 shown in its new location coming off pin 5 of U601
Figure 5



Newer 8655 U601 Board Layout
R618 & R619 are laid out on the board
33 pf chip caps. added as required from pins 2 to 3 and pins 5 to 6
C605 shown in its new location coming off pin 5 of U601
Figure 6