# ACCESSORY KIT 22 INSTRUCTION SHEET

Adapts OPTIMOD-FM<sup>R</sup> Model 8100A/I Audio Processor to accept FM Filter Card  $\#\emptyset$ . (This kit and instruction sheet can also be used to adapt the Model 8100A).

This kit contains:

#### DESCRIPTION

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FM Filter Card #Ø Prewired Connector & Hardware Modification Label Card Guide Registration Card

## INTRODUCTION:

The FM Filter Card (Card #0) replaces the safety clippers in the OPTIMOD-FM Audio Processor with a pair of overshoot-compensated, low-pass filters in order to significantly reduce (by 25-30dB) "splatter" in the SCA region of the baseband, as compared with the "stock" 8100A or 8100A/1. It also reduces any residual overshoot by about 6%.

With this Accessory, the processing can be easily adjusted to achieve a loudness level within 0.3dB of that accomplished by composite clipping (an inaudible difference), while protecting the SCA region about 40-50dB better that a composite clipper can.

Even with less than extremely aggressive processing, the SCA region is much more rigorously guarded from interference from the stereo subcarrier.

OPTIMOD-FM Model 8100A/1 was designed to meet all rules in the now-deleted FCC 73.322 regarding crosstalk between the main channel and subchannel. Higher performance than is required by the FCC is sometimes desirable to fully protect SCA subcarriers from interference caused by the operation of the 8100A/1's safety clippers (on Cards #8 and #9) on extremely densely-processed program material, or simply to allow a higher level of peak modulation without an increased risk of overmodulation.

Card  $\#\emptyset$  is installed in the signal path between the output of the existing Cards #8 and #9 (filters) and the input of Card #7 (stereo generator). The frequency response of the Card is typically +0, -0.1dB, 30-15,000Hz. An 8100A/1 containing this card will therefore perform well within its +0.75dB specification limit.

Card  $\#\emptyset$  has been specifically designed to be used in conjunction with the 8100A/l's existing FCS Overshoot Corrector. Card  $\#\emptyset$  is therefore unusable with the older OPTIMOD-FM Model 8000A, or with other manufacturers' equipment.

## INSTALLATION:

Installation consists of a slight modification of the Cards #8 and #9 and installation of a prewired connector for Card  $\#\emptyset$ .

If you have not had much experience desoldering on double-sided printed circuit cards, please read the section entitled "Replacement of Components on Printed Circuit Cards" in Appendix F of the 8100A/1 Operating Manual.

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You will need:

-OPTIMOD-FM 8100A/1 Operating Manual -A 5/64" hex (Allen) wrench for access -A 3/16" flat-blade screwdriver for access -Small diagonal cutters -Chain-nose pliers (or small needle-nose) -A low-wattage soldering iron with a small tip, suitable for PCB soldering work -Rosin-core solder -Flux removal solvent (see Appendix F of the 8100A/1 Operating Manual for suggestions) -Cotton swabs for flux removal

-Spring-actuated desoldering tool

Allow about one hour.

## Procedure:

- 1. Refer to "Routine Access" in Appendix C of the 8100A/1 Operating Manual for instructions on gaining access to cards.
- 2. Remove Cards #8 and #9 from the 8100A/1 chassis.

On each card (they are identical), desolder one lead each of diodes CR805 and CR806 and clear their pads of solder with the desoldering tool. Lift each diode so that it "hangs" in midair by the lead that is still attached. (This makes it easy to restore cards #8/9 to "stock" condition in the future if desired.)

3. Detach rear panel according to the "Access to Area Behind Rear Panel" instructions in Appendix C of the 8100A/1 Operating Manual.

#### CAUTION

Watch for snags in the internal wiring and for any stress on the ceramic feed-through capacitors on the divider wall or RF filter box. These capacitors are very fragile and difficult to replace.

- 4. Align the connector with slot Ø. Using the hardware supplied, attach the prewired connector JØ to the rear rails (mount the connector on the side of the rails that the other connectors are attached to). Install the two card guides by snapping them into existing holes in the sheet metal.
- 5. On the solder side of the motherboard, unsolder the BLUE wire from the solder fork for pin X of the Card #8 connector (J8-X), then solder it to pin N of the Card #0 connector (J0-N). Unsolder the GREY wire from the solder fork for pin X of the Card #9 connector (J9-X), then solder it to pin T of the Card #0 connector (J0-T).

To reroute these wires, you will need to partially unwind them from the other wires in the harness and to cut some cable ties. To preserve separation performance, do not bundle these two wires together.

6. The Card  $\#\emptyset$  connector is supplied with the following wires attached. Solder the free ends of the wires to the indicated points (located on the solder side of the motherboard). Do not bundle the wires together.

Whe color	<u>r rom</u>	Solder to solder fork for pin
BLACK	JØ-A	A of Card #3 connector (J3-A)
RED	JØ-В	B of Card #3 connector (J3-B)
BLACK	JØ-C	C of Card #3 connector (J3-C)
YELLOW	JØ-E	E of Card #3 connector (J3-E)
WHITE/BLUE	JØ-L	X of Card #8 connector (J8-X)
WHITE/GREY	JØ-R	X of Card #9 connector (J9-X)
VIOLET	JØ-U	U of Card #6 connector (J6-U)*
WHITE	JØ-V	V of Card #6 connector (J6-V)*

\*Tack-solder to pin (no fork).

The wire lengths have been chosen to provide enough slack to enable other service operations on the rear panel to be performed in the future. It would be unwise to shorten the wires.

It is safe to tack-solder to the motherboard with the circuit cards in place except in very high RF fields, in which case all cards should be removed. In any case, we recommend using a soldering iron with a grounded tip to minimize possibility of circuit damage.

Avoid using excessive amounts of heat or flux at the motherboard (the connectors could be damaged by tempering of the contacts through excessive heat or by creepage of flux). In addition, because some of the motherboard traces are close together, inspect your work very carefully to be sure that you have not created solder bridges between traces or pads.

- 7. Install Card Ø in the 8100A/1 chassis.
- 8. Reattach the rear panel by reversing the disassembly procedure. (Refer again to Appendix C of the OPTIMOD 8100A/1 Operating Manual.)
- 9. Attach the Modification Label close to the Serial Number Label on the rear panel (after first cleaning the area with a solvent, such as alcohol, naptha, or spot remover).

## ALIGNMENT

Required Equipment:

-Audio oscillator

-AC voltmeter with better than +1% resolution (a DVM is ideal)

The following procedure is performed for both Card #8 (left channel) and Card #9 (right channel). It slightly increases the gain from the input of each card to its output.

- If Cards #8 and #9 have not already been removed from their slots, remove them.
- Insert the extender board into slot #8. Apply power to the 8100A/1. Place both PROOF/OPERATE switches in PROOF and let the gain settle for at least 2 minutes.
- 3. Connect the oscillator to the LEFT INPUT of the 8100A/1. Place Card #8 in the extender (you may do this while the unit is powered up without causing damage). Connect the AC voltmeter to the junction of R823 and R825 on Card #8. Connect its ground to the side of R826 pointing towards the three upper inductors, or any other convenient circuit ground on the card. Set the oscillator to 400Hz, and turn its output level all the way down. Make sure that the reading on the voltmeter is less than 0.01V (if it isn't, you are probably picking up hum; eliminate any such hum before making the following adjustment).
- 4. Advance the output attenuator on the audio oscillator until the voltmeter reads exactly 1.00 volt RMS. Now move the meter to the junction of CR805 and R840, and adjust R841 (Safety Clipper Thresh) until the meter reads exactly 1.00V RMS (it will typically read approximately 0.94V RMS before the adjustment is made).

[You have just adjusted the card so that the new Card  $\#\emptyset$  sees exactly the same level as the overshoot compensation clipper (CR803, CR804) on Card #8 did.]

- Remove Card #8 from the extender and replace it with Card #9. Do not move the extender from slot #8. Then adjust Card #9 using the same procedure (steps 3 and 4) that you followed in adjusting Card #8.
- 6. Remove the card and extender from slot #8, and re-install Cards #8 and #9 in their correct slots.

38kHz NULL: Any DC offset between the left and right inputs of the Stereo Generator will unbalance the doubly-balanced modulator which generates the stereo subchannel, unsuppressing the 38kHz subcarrier. Cards #8 and #9 can each exhibit as much as 30mV DC offset; appropriate adjustment of the Stereo Generator's 38kHz NULL trimmer (R714 on Card #7) compensates for this offset.

The new Card  $\#\emptyset$  contains servos to ensure that the DC offset at its outputs is less than 2mV. Therefore, the DC offset between the left and right channels at the input of the Stereo Generator may change when Card  $\#\emptyset$  is installed. We recommend measuring 38kHz subcarrier suppression on your stereo monitor after Card  $\#\emptyset$  is installed. If the suppression is poorer than -50dB, extend Card #7 and adjust R714 (38kHz NULL) to null the subcarrier.

THIS CONCLUDES SYSTEM ALIGNMENT. Replace all cards and the subpanel, close the main panel, and place the 8100A/l back into service.

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NOTES: (UNLESS OTHERWISE SPECIFIED)

- 1. REFERENCE SCHEMATIC PIN 61002-000

