MOTOROLA INC.

SABER™
SECURENET™ Handie-Talkie® Portable Radios
NTN1089A Fascinator™ Encryption Module Retrofit Kit
Supplement to Service Manuals
68P81045C70, 68P81045C75, and 68P81063C30

WARNING

Installation and use of this module voids Factory Mutual Research Corporation (FMRC) approval. FMRC approved radios must be returned to Motorola for installation. Additional radio modifications are necessary to maintain the FMRC approval.

1. DESCRIPTION

SABER™ SECURENET™ Handie-Talkie® portable radios include the ability to receive and transmit secure-coded voice transmissions. Option H796 modifies a standard SECURENET radio to operate with a Fascinator™ encryption module. The NTN1089A Retrofit Kit supplies the NTN7298 Fascinator encryption module and the information needed to field modify a SABER SECURENET radio to include the H796 option.

NOTE
To be retrofittable, the radio to be modified must be equipped with a coded/clear selector switch.

This manual provides the information required to field modify SABER SECURENET radios to operate with either the Fascinator module or the existing SECURENET module. The manual also includes the Radio Service Software (RSS) procedure for reprogramming the radio for Fascinator operation.

Fascinator encryption provides two-key radio operation; a radio channel can be strapped to either key location, but not both, using the RSS. Before a key can be used, it must first be downloaded into the radio, using keyloading equipment.

2. RADIO OPERATION

A SABER radio with the Fascinator encryption module operates the same as with other encryption modules, as described in the radio's operating instructions. However, the procedure for Fascinator keyloading does differ from the standard SABER keyloading procedure.

- **Fascinator Keyloading**

With Fascinator encryption, keyloading requires several pieces of equipment: the T5164x ("x" refers to the product version; that is, A, B, etc.) Security Interface Box (SIB), the TKN8516x Keyloader cable, and either the KOI-18 or the KYK-13 Government Fill Device (GFD). Information for connecting this equipment to the radio is included in Motorola Instruction Manual 68P81078E10 (provided with the SIB). Connect the GFD, SIB, and cable together, but do not connect the cable to the radio. Load the key(s) as follows:

(a) Turn the radio on.

(b) Select the channel onto which the first key is to be loaded.

(c) Attach the keyloader cable to the radio's universal connector.

(d) Load the first key.

(e) Remove the keyloader cable from the radio.

(f) Select the channel onto which the second key is to be loaded.

(g) Attach the keyloader cable to the radio's universal connector.

(h) Load the second key.

(i) Remove the keyloader cable from the radio.

3. FASCINATOR ENCRYPTION MODULE INSTALLATION

The following procedure should be performed whenever installing a Fascinator encryption module in a SABER secure-capable radio:

a. Referring to the applicable service manual (68P81063C30 [Mid-Band], 68P81045C70 [VHF], or 68P81045C75 [UHF]), remove the existing U900 module and replace it with the enclosed NTN7298 Fascinator module.

The retrofitting of an existing radio may require more than just a simple module swap. Depending

Instruction Manual

68P81067C50-A

Table 1. SABER Radio Fascinator Modification Requirements

Frequency Range	Radio PC Board (See Note 1)	Retrofittable?	Modification Requirements (See Note 2)	Modification Procedure
Mid-Band	All boards without an "**F**"	Yes	Make 2 Board Cuts; Add 2 Wire Jumpers; Add 1 Resistor	1
Mid-Band	All boards with an "**F**"	Yes	None	None
VHF	All boards without an "**F**"	Yes	Make 3 Board Cuts; Add 3 Wire Jumpers; Add 1 Resistor	2
VHF	All boards with an "**F**"	Yes	None	None
UHF	All boards without an "**F**"	No	None	None
UHF	All boards with an "**F**"	Yes	None	None

Notes: 1. The term "**F**" refers to the letter "**F**" stenciled in the lower left corner of the Radio PC board.
2. Refer to Figure 1 or Figure 2, the Electrical Parts List, and the Mid-Band or VHF schematic diagrams.

on the radio involved, modification of the radio may also be required. Refer to Table 1 for modification requirements, then, if necessary, modify layer 1 of the main circuit board according to one of the following procedures:

(1) *Procedure 1 (Mid-Band) (Refer to Figure 1)*

(a) Cut the runner between R414 and R405.

(b) Cut the runner between pin 1 of J2 and the "K" leg of VR812.

(c) Connect and solder a wire between R414 (the side that was formerly connected to R405) and pin 10 of U900.

(d) Connect and solder a wire between pin 1 of J2 and Pin 10 of U900.

(e) Solder 100kΩ chip resistor R507 between pin 10 of U900 and pin 9 of U900.

(2) *Procedure 2 (VHF) (Refer to Figure 2)*

(a) Cut the runner between R414 and R405.

(b) Cut the runner between R414 and R416.

(c) Cut the runner between pin 1 of J2 and the "K" leg of VR812.

(d) Connect and solder a wire between R414 (the side that was formerly connected to R405 and R416) and pin 10 of U900.

(e) Connect and solder a wire between R405 (the side that was formerly connected to R414) and R416 (the side that was formerly connected to R414).

(f) Connect and solder a wire between pin 1 of J2 and Pin 10 of U900.

(g) Solder a 100kΩ chip resistor R507 between pin 10 of U900 and pin 9 of U900.

b. Using the SABER Fascinator radio service software, connect the radio to the computer, then read the radio's personality into the computer.

c. Modify the radio's personality file as follows:

(1) Select **CHANGE/CREATE/VIEW** data from the master menu; from the resulting display menu, select **RADIO FEATURES OPTIONS** data. Select option **H796** (Fascinator).

(2) Select **CHANNEL INFORMATION**, then move the cursor to the **KEY NUMBER 1/KEY NUMBER 2** field for key selection. Select the desired key by entering "1" for key number 1 or "2" for key number 2. The default selection is **KEY NUMBER 1**.

(3) Repeat step (2) for the remaining radio channels.

d. Return to the master menu and ensure that the transmit "clear" deviation has been properly tuned beforehand, then check "coded" deviation. It is only necessary to check one channel.

(1) If coded deviation *is not* within 4kHz ±500Hz, tuning will be required. Skip the rest of this step and proceed to step e.

(2) If the deviation *is* within 4kHz ±500Hz, no tuning will be required. **WRITE** the modified personality for Fascinator operation to the radio. This completes the programming procedure; proceed to step f.

e. Select **SERVICE** from the master menu. From the resulting menu, select **ALIGN RADIO PARAMETERS**.

NOTE
The channel selector should not be changed while the field programmer is in this menu.

(1) In the resulting menu, move the cursor to **DVP DEVIATION OFFSET** and tune the coded deviation according to the Radio Service Software User's Guide. Since this is an offset tuning, only one channel needs to be tuned.

(2) When the correct DVP deviation has been obtained, **ESCAPE** to the master menu and **WRITE** the modified and tuned personality to the radio. This completes the programming procedure; proceed to step f.

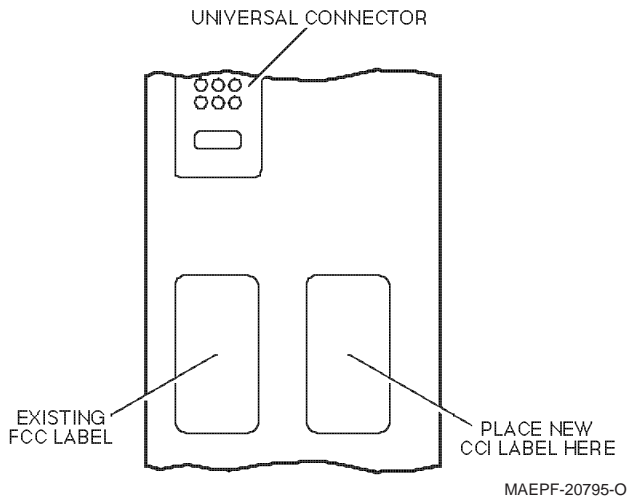f. Affix the Fascinator encryption label (CCI label) to the back cover of the radio as shown in Figure 3.

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Figure 3. Affixing the CCI Label to the Radio

4. NON-FASCINATOR ENCRYPTION MODULE INSTALLATION

The following procedure should be performed whenever a non-Fascinator encryption module must be installed in a Fascinator-capable radio:

a. Check the kit number of the encryption module to be installed.

b. Refer to Table 2 and modify the module to be installed as required. If pin 10 of the module must be cut, see Figure 4 for pin location.

c. Using the SABER Fascinator Radio Service Software, deselect option **H796** (Fascinator).

d. Reprogram the radio. Refer to the Encryption Module Changeout Procedure (68P81045C61) provided with the new module.

Table 2. Non-Fascinator Encryption Module Modification

U900 Kit Number	Modification
NTN4711A NTN4711B	Cut Pin 10
NTN4712A NTN4712B	None
NTN4713A NTN4713B	Cut Pin 10
NTN4714A NTN4714B	None
NTN4720A	None
NTN5832A	None
NTN5833A	None
NTN5834A	None
NTN5835A	None
NTN5836A	None

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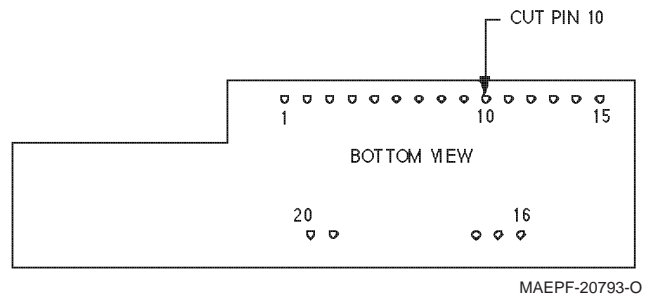
Figure 4. Modifying a Non-Fascinator Module

NTN1089A
Fascinator Encryption Module Retrofit Kit
Electrical Parts LIst   TPLF-3901-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R507	0660076B01	**RESISTOR, Fixed; $\Omega\pm5\%$; 1/8 W** 100k
U900	NTN7298	**CIRCUIT MODULE** Fascinator Encryption

NOTES