

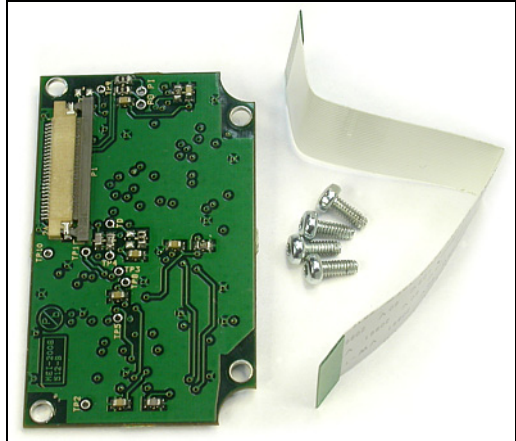
TPK-OP-101 TP8100 Encryption Options Board Installation Instructions


Introduction

The TP8100 encryption options board (TPK-OP-101) adds encryption functionality to a trunked or conventional TP8100 radio that is equipped with PCB hardware version 0303 or later, radio firmware version 2.05 (trunked radios) or 1.08 or later (conventional radios).


The kit supplies the following items:

- TP8100 encryption options board (TPK-OP-101)
- 4x M2x5 mm self-tapping screws (345-00011-00)
- 26-way 70mm Flat Flex Circuit (FFC) cable (219-03114-01)



 Midian Electronics Inc. calls the TPK-OP-101 the ‘TVS-2-TP8 High Level Hopping Code Scrambler for Tait TP-8100’. Tait calls it an ‘encryption’ board because every TP8100 radio already has voice inversion scrambling as a programmable security feature. A TP8100 that is fitted with an encryption board is capable of both scrambler and TVS-2 encryption functionality, but not at the same time.

These installation instructions describe how to install the encryption board in a TP8100 radio, and how to program the radio to enable encryption. They assume that the radio will use one or more of the four default encryption codes that are supplied preinstalled on the board.

 Midian Electronics Inc. supplies the four default encryption codes that are preinstalled on the TPK-OP-101 encryption board. These codes are not unique to Tait radios, and may be present on other radios that are fitted with a Midian encryption board. Any radios that use the same encryption code on the same channel can decode all communications on that channel. If this is unacceptable, install the encryption board and program the radio as described below. Then use a TP8100 Encryption Module Programming Adapter (TPK-SV-008) to load custom encryption codes onto the board. Follow the instructions provided with the adapter.

Installation

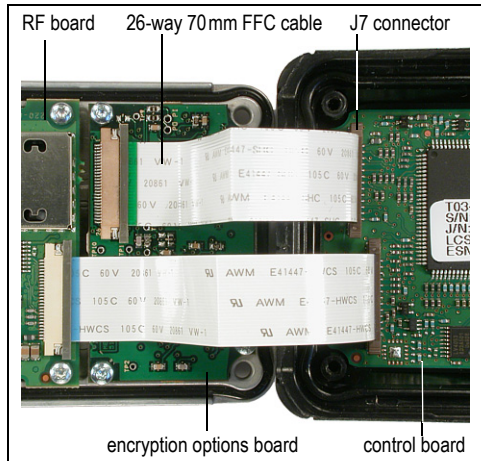
Warning Do not attempt to fit a TP8100 encryption options board (TPK-OP-101) to an intrinsically safe (IS) radio unless you are specifically certified to do so by both Tait and the relevant Intrinsic Safety approval authority. Any unauthorized modification of an IS item exposes the customer to a risk of explosion which could cause serious injury or death. Unauthorized repairs invalidate both the Intrinsic Safety rating and the third-party IS approval. For more information refer to the TP8100 Service Manual (MPC-00003-xx).

Notice The TP8100 radio is uniquely designed to meet published specifications for protection against entry ('ingress') by water and dust. Be aware of this point of difference as you prepare to install the encryption options board. Opening the radio invalidates the IP67 and IP65 ratings that characterize the radio when it leaves the factory. Do not open the radio until you have read the section on vacuum and pressure testing in the TP8100 Service Manual. If vacuum and pressure testing is required, make sure that you are equipped to perform the testing or can arrange to send the radio for testing at a regional Tait office. Then disassemble the radio, install the board, reassemble the radio, and vacuum and pressure test the radio exactly as described in the service manual.

The encryption options board fits into the space below the RF board on the chassis and is secured by four screws (345-00011-00, supplied).


Use a Torx T6 driver, preferably with a magnetic tip, to secure the encryption options board to the chassis.

The white 26-way 70mm Flat Flex Circuit (FFC) cable (219-03114-01, supplied) connects the encryption options board to J7 on the control board.



Programming the Radio to Enable Encryption


Install the encryption options board in the radio and then program the radio to enable encryption. Use the appropriate TP8100 radio programming application (trunked or conventional), version 2.05.00.0005 or later, supplied on the TP8100 Programming Utilities CD (406-00060-xx).

-  For detailed information about how to program a TP8100 radio, including the fields on each tab, please refer to the online help that accompanies the programming application. To access the help from the application, select Help > Contents and Index, or press F1.


Before starting to program the radio, determine whether the radio user will have manual control of encryption (see Step 12). If yes, determine whether the radio user will control encryption using the function keys, the user menu, or both the function keys and the user menu.

To program the radio:

1. Connect the radio to the computer.

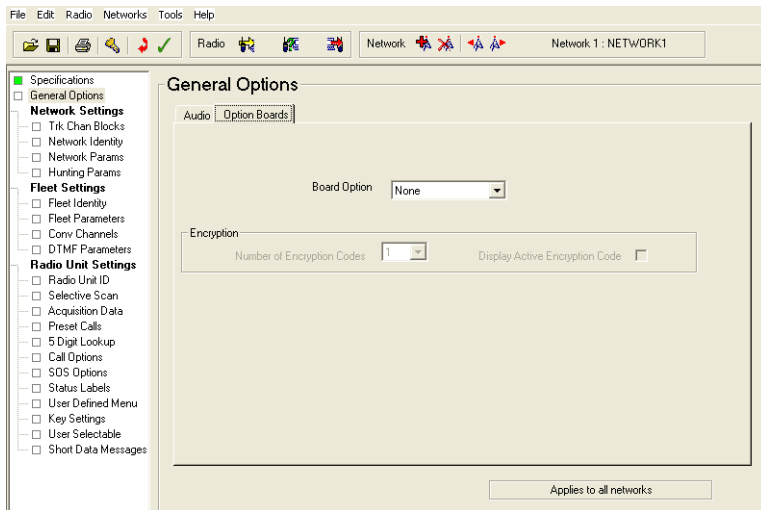
-  **Tip:** If loading custom codes to the encryption options board later, you can connect the radio to the computer using the TP8100 Encryption Module Programming Adapter (TPK-SV-008). Follow the instructions provided with the adapter.

2. Start the appropriate Tait radio programming application (trunked or conventional).
3. When you reprogram the radio, all current programming data will be overwritten and a new programming database will be created in the radio. Back up the programming database that is currently on the radio, in case you need to restore it later:
 - Switch on the radio, use the programming application to read the programming database from the radio, and then save the programming database to the computer. You may need to switch the TP8100 radio off and then on again when reading the programming database.
4. When you reprogram the radio, the calibration database will not be affected. But best practice is to back up the calibration database that is currently on the radio:
 - Start the calibration application, read the current calibration database from the radio, and save the calibration database to the computer.
5. Return to the programming application.

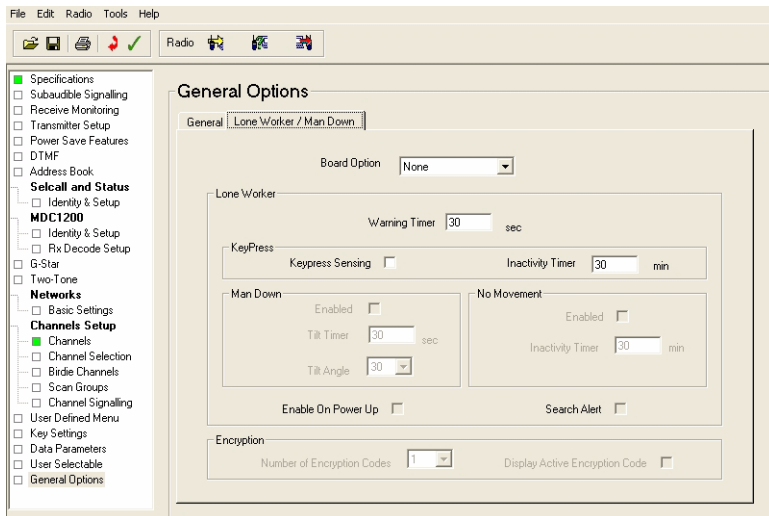
-  **Tip:** Before programming the entire fleet, program two radios and make sure that they can still communicate. If necessary, you can program the radios again. An encrypted call can be deciphered when the same encryption code is active on the radio making the call and on the radio receiving the call.

6. Do one of the following:
 - **Trunked radio:** From the forms tree on the left of the main programming window, select General Options > Option Boards. This figure shows the default settings for a trunked radio. The settings selected on this tab will be applied on any network that

the radio is used on. (You do not need to click ‘Applies to all networks’.)



- **Conventional radio:** From the forms tree on the left of the main programming window, select General Options > Lone Worker / Man Down. This figure shows the default settings for a conventional radio.



7. Set the Board Option field to Encryption.
8. In the Number of Encryption Codes field, enter the total number of encryption codes that must be available on the radio. For example, if you select ‘2’ and use the default encryption codes, the first two of the four default encryption codes will be available. If you select ‘2’ and later load four custom encryption codes, the first two of the four

custom codes will be available.


9. The Display Active Encryption Code check box is cleared by default.

When a TP8100 is programmed to enable encryption, a small flashing key icon is visible at the bottom of the radio display. If the Display Active Encryption Code check box is selected, however, the radio displays additional encryption information. For example, when an encrypted channel is selected, the radio displays a large key icon; when a clear channel is selected, the radio displays a large crossed-out key icon. When any channel is selected, the radio also displays the number (1, 2, 3, or 4) of the encryption code currently in use on the radio.

10. Unless you have reason to change them, leave other settings on the tab unchanged.

11. **Conventional radio only:** Program each channel to be either clear or encrypted. From the forms tree on the left of the main programming window, under Channels Setup, select Channels. A list of channels is displayed.

- a. For each channel in turn, for every channel in the list, set the Secure Mode column to Encrypted or NONE.

 Program at least one clear channel. If two radios are using different encryption codes, they can use a clear channel to agree which encryption code to use. When two radios use different codes, the recipient can hear that a call is incoming but cannot hear the message or see which code it is using.

- To configure a channel as a clear channel, set the Secure Mode column to NONE. Best practice is to program all channels as clear channels. If a channel is clear by default, a radio user with manual control of encryption can turn encryption on and off for this channel as required (see Step 12).
- To configure a channel as an encrypted channel, set the Secure Mode column to Encrypted. No radio user can turn off encryption on this channel. However, a radio user with manual control of encryption can select which of the available encryption codes the channel uses.


12. Optional. Give manual control of encryption to the radio user. This will enable the radio user to activate encryption features by pressing function keys and/or by making selections from the user menu on the radio display. You can program the radio to enable either or both of the following methods:

- Option 1: Enable the radio user to control encryption using the function keys.

To program the function keys, from the forms tree on the left of the main window, select Key Settings. The Key Settings tab appears:

- a. Specify which function key the radio user will press to toggle encryption on or off for transmissions on the selected channel, if encryption can be turned off for the selected channel. For example, choose the setting Short Press > Function Key 1 > Encryption.
- b. If multiple encryption codes are available to the radio (see Step 8): Specify which function key the radio user will press to select a different encryption code. For example, choose the setting Short Press > Function Key 2 > Select Encryption

Code. To activate any of the encryption codes that are available to the radio, the radio user selects the number associated with the required code: 1, 2, 3, or 4.

 The radio will apply the currently selected encryption code to all encrypted communications. The radio user cannot apply different encryption codes to different channels. If a channel requires encryption, the encryption code most recently used by the radio will be applied. Changing channels, turning the radio off and on, or removing the battery will not change which encryption code the radio uses. To apply a different encryption code, the radio user must actively select a different code.

■ Option 2: Enable the radio user to control encryption from the user menu.

To program the user menu, see the online help provided with the programming application. The 'setting up encryption' topic in the help describes how to configure the menu options:

- a. The ENCRYPT menu option enables the radio user to toggle encryption on or off for transmissions on the selected channel, if encryption can be turned off for the selected channel. To make ENCRYPT available from the user menu, from the forms tree on the left of the main window, select User Defined Menu. Under SECURITY SETTINGS, select the ENCRYPT check box.
- b. If multiple encryption codes are available to the radio (see Step 8), the SELECT CODE menu option enables the radio user to select a different encryption code. To activate any of the encryption codes that are available to the radio, the radio user selects the number associated with the required code: 1, 2, 3, or 4. For more information see the previous Note.

13. Program the radio with the changes. You may need to switch the TP8100 radio off and then on again when reprogramming the radio.

More Information

Refer to your radio provider for more information about these products.