



MOT-TVS-2-PRO-M

Frequency Hopping, Rolling Code Voice Scrambler for Motorola Professional Series Mobile Radios

MOT-VPU-15-PRO-M

Voice Inversion Scrambler for Motorola Professional Series Mobile Radios

Manual Revision: 2014-05-19

Covers Software Revisions:

MOT-PRO: 2.95 and Higher

Covers Hardware Revisions:

MOT-PRO: 7313F and Higher

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This manual supports the following Midian TVS-2 and VPU-15 scramblers:

MOT-TVS-2-PRO-M & MOT-VPU-15-PRO-M

MOT-TVS-2-PRO-M MOD-1306 & MOT-VPU-15-PRO-M MOD-1306

MOT-TVS-2-PRO-M MOD-1331 & MOT-VPU-15-PRO-M MOD-1331

This manual supports the following radios:

North America: CDM-750, CDM-1250, CDM-1550-LS+

EMEA Region: GM-140, GM-160, GM-340, GM-360, GM-380, GM-640, GM-660, GM-1280

Asia: GM-328, GM-338, GM-338-LS, GM-339, GM-398, GM-399, MCX-720, MCX-760, MCX-780

Latin America: PRO-3100, PRO-5100, PRO-7100, PRO-7200

SPECIFICATIONS

Operating Voltage	3.3 VDC
Operating Current	8 mA
Operating Temperature	-30 - +60 C
Frequency Response	300-2100 Hz
Input Impedance	≥200 kΩ
Carrier Suppression	60 dB < Peak Voice
Audio Output Impedance	≤75 Ω
Tone Distortion	<1%

Encryption Specifications

TVS-2: Encryption Sequences	+40 Trillion
TVS-2: Random Number Generator	64 bits
TVS-2: Sequence Length (est.)	84 billion years
VPU-15: Inversion Codes Available	37

GENERAL INFORMATION

The MOT-TV2-PRO series is a high-level hopping code scrambler that plugs into the Motorola Professional series radios. Midian's TVS-2 uses the hopping type rolling code encryption for higher security rather than sweeping code type and offers 4 user-programmable hop rates and is down gradable to voice inversion. The scrambler is capable of features such as ANI, ENI, OTAR, Deadbeat Disable, Spy, and more when using Midian's Kryptic Signaling format with Midian's CAD-300 and DDU-300.

The MOT-VPU-15-PRO series is an entry level voice inversion scrambler that plugs into the Motorola Professional series radios. The scrambler is capable of features such as ANI, ENI, OTAR, Deadbeat Disable, Spy, and more when using Midian's Kryptic Signaling format with Midian's CAD-300 and DDU-300.

For more detailed information on the scramblers' features, troubleshooting and system information please reference the TVS-2 Technical Reference Manual.

INSTALLATION OVERVIEW

1. Test the radio for functionality.
2. Program the radio per the Radio Programming Section of this manual.
3. Install the scrambler into the radio per the Hardware Installation Section of this manual.
4. Program the scrambler per the Product Programming Section of this manual.

Note: Midian is not responsible for any damage/loss resulting from the use of Midian's products.

RADIO PROGRAMMING

MOT-TVS-2-PRO-M & MOT-VPU-15-PRO-M for Motorola MDC-1200 capable mobile radios CDM-750, CDM-1250, GM-140, GM-160, GM-328, GM-338, GM-398, PRO-3100, PRO-5100, PRO-7100 Programming Instructions

It is necessary to program the radio before installing the scrambler. This is because the **Option Board Feature** of the radio must be enabled in order to program the scrambler using a RIB box and to hear confirmation beeps from the radio after programming the scrambler.

1. In the Radio Configuration Window under the Option Board Tab, select Advanced Option Interface as the Option Board Type. Do not check the Option Board Configuration Download box.



2. When programming the "Conventional Personality", Pre-Emphasis may be enabled, but De-Emphasis **must** be disabled. This is because De-Emphasis will prevent the scrambler from decoding synchronization data. Compression should not be used with the scrambler. No, or Low Level expansion may be used. Check the **Option Board Feature** box for all channels if using a button to control the mode of the scrambler. If doing scrambling on a per channel basis, then check Option Board Feature only for scrambled channels. It will be necessary to set the power up state of the scrambler to Scramble for per channel scrambling.



The following two steps apply to the accessory connector and may be skipped by most users.

3. An accessory pin may be used to control the transmit mode of the scrambler between scramble and clear. This is useful in remote control applications. To enable this feature, one of the radio accessory pins must be assigned to **Option Board 1 (Input)** via the CPS programmer.
4. An accessory pin may be used to initiate an emergency ANI. This allows for an external emergency foot switch or button, and frees-up one of the radio front buttons. To enable this feature, one of the radio accessory pins must be assigned to **Option Board 2 (Input)** via the CPS programmer. The switch must be held in the active state for about 2 seconds before an emergency ANI will be sent.

Note: Accessory pin features do not require any special scrambler programming.

The image shows a screenshot of the 'Radio Configuration' software window. The 'Accessory Pins' tab is selected. It displays a table for configuring accessory pins. The 'Accessory Package' is set to 'Default'. The table has columns for Pin #, Function Selection (Direction), Active Level, and Debounce Enable. Pins 3 and 14 are configured with specific functions and have their debounce enable checkboxes checked.

Pin #	Function Selection (Direction)	Active Level	Debounce Enable
3	External Mic PTT (Input)	Low	☒
4	Null	Low	☐
6	Null	Low	☐
8	CSQ Detect (Output)	Low	☐
9	Null	Low	☐
12	Null	Low	☐
14	Option Board 1 (Input)	Low	☒

MOT-TVS-2-PRO-M & MOT-VPU-15-PRO-M
GM-339, GM-340, GM-360, GM-380, GM-399, PRO-7200 Programming Instructions

It is necessary to program the radio before installing the scrambler. This is because the **Option Board Feature** of the radio must be enabled in order to program the scrambler using a RIB box and to hear confirmation beeps from the radio after programming the scrambler.

1. In the Per Radio Miscellaneous Window under the Global Tab, select “Advanced” as the “Option Board Type” and set the RX Audio (Accessory Connector) to “Filtered Squelched”. Note: The Accessory Connector is the rear accessory connector, but this setting also affects the audio going to the options connector.



2. For each personality, under the Miscellaneous tab, the “Option Board” must be enabled. Check the Option Board box for all channels if using a button to control the mode of the scanner. If doing scrambling on a per channel basis, then check Option Board Feature only for scrambled channels. It will be necessary to set the power up state of the scrambler to Scramble for per channel scrambling.



3. For each personality, under the “Audio” tab, the “Voice Pre-emphasis/De-emphasis” must be disabled.



MOT-TVS-2-PRO-M MOD-1306 & MOT-VPU-15-PRO-M MOD-1306 CDM-1550-LS+, GM-338-LS Programming Instructions

It is necessary to program the radio before installing the scrambler. This is because the **Option Board Feature** of the radio must be enabled in order to program the scrambler using a RIB box and to hear confirmation beeps from the radio after programming the scrambler.

Conventional Programming:

1. In the Radio Configuration Window under the Option Board Tab, select Advanced Option Interface as the Option Board Type. Do not check the Option Board Configuration Download box.



2. When programming the "Conventional Personality", Pre-Emphasis may be enabled, but De-Emphasis **must** be disabled. This is because De-Emphasis will prevent the scrambler from decoding synchronization data. Compression should not be used with the scrambler. No, or Low Level expansion may be used. Check the **Option Board Feature** box for all channels if using a button to control the mode of the scanner. If doing scrambling on a per channel basis, then check Option Board Feature only for scrambled channels. It will be necessary to set the power up state of the scrambler to Scramble for per channel scrambling.



LTR Programming:

1. In the LS Trunking Personality window, check the Option Board Feature box for each personality. Check the **Option Board Feature** box for all channels if using a button to control the mode of the scrambler. If doing scrambling on a per channel basis, then check Option Board Feature only for scrambled channels. It will be necessary to set the power up state of the scrambler to Scramble for per channel scrambling.

2. In the LS Trunking Site window Pre-Emphasis should be enabled, but De-Emphasis must not be enabled. This is because De-Emphasis will prevent the scrambler from decoding synchronization data. The scrambler by its very nature performs De-Emphasis function. Compression should not be used with the scrambler. Expansion should also be disabled.

	Rx Ref Freq	Tx Ref Freq	Compression Type	Expansion Type	Emphasis Select
1	Default	Default	Disabled	Disabled	Pe-Emphasis
2	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
3	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
4	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
5	Default	Default	Disabled	Disabled	Pe-Emphasis
6	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
7	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
8	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
9	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
10	Default	Default	Disabled	Disabled	Pe-Emphasis
11	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
12	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
13	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
14	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
15	Default	Default	Disabled	Disabled	Pe-Emphasis
16	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
17	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E
18	Default	Default	Disabled	Low-level Expar	Ds-Emp & Pre-E

The following two steps apply to the accessory connector and may be skipped by most users.

5. An accessory pin may be used to control the transmit mode of the scrambler between scramble and clear. This is useful in remote control applications. To enable this feature, one of the radio accessory pins must be assigned to **Option Board 1 (Input)** via the CPS programmer.
6. An accessory pin may be used to initiate an emergency ANI. This allows for an external emergency foot switch or button, and frees-up one of the radio front buttons. To enable this feature, one of the radio accessory pins must be assigned to **Option Board 2 (Input)** via the CPS programmer. The switch must be held in the active state for about 2 seconds before an emergency ANI will be sent.

Note: Accessory pin features do not require any special scrambler programming.

The image shows a screenshot of the 'Radio Configuration' software window. The 'Accessory Pins' tab is selected. The 'Accessory Package' is set to 'Default'. The configuration table below shows the settings for pins 3, 4, 6, 8, 9, 12, and 14.

Pin #	Function Selection (Direction)	Active Level	Debounce Enable
3	External Mic PTT (Input)	Low	☒
4	Null	Low	☐
6	Null	Low	☐
8	CSQ Detect (Output)	Low	☐
9	Null	Low	☐
12	Null	Low	☐
14	Option Board 1 (Input)	Low	☒

At the bottom of the window are 'Close' and 'Help' buttons.

MOT-TVS-2-PRO-M MOD-1331 & MOT-VPU-15-PRO-M MOD-1331 for MPT-1327 Trunking Radios GM-640, GM-660, GM-1280, MCX-720, MCX-760, MCX-780 Programming Instructions

It is necessary to program the radio before installing the scrambler. This is because the **Option Board Feature** of the radio must be enabled in order to program the scrambler using a RIB box and to hear confirmation beeps from the radio after programming the scrambler.

1. In the Per Radio Parameters Window set the “Option Board Fitted Mode” as “Advanced”.

The screenshot shows the 'Per Radio Parameters' window. The 'DTMF Tones' section has 'Conventional DTMF' checked. 'Min Tone Duration (s)' is 0.025 and 'Min Inter-Tone Duration (s)' is 0.025. 'Disable Short Data Display' is checked. 'Range Alert Tone Period (s)' is 1. 'MPT RSSI L0 Level' is -110, 'MPT RSSI L1 Level' is -114, and 'MPT RSSI L2 Level' is -94. 'Voice Storage Long Press Duration (s)' is 1 and 'Voice Storage Warning Duration (s)' is 0.5. At the bottom, 'Option Board Fitted Mode' is set to 'Advanced'.

2. Edit the 'MPT Personality'. In the “Options” window, check the “Option Board Enable” box. Check Option Board Enable for all channels if using a button to control the mode of the scrambler. If doing scrambling on a per channel basis, then check Option Board Enable only for scrambled channels. It will be necessary to set the power up state of the scrambler to Scramble for per channel scrambling.

The screenshot shows the 'Options' window. Under 'Voice Storage', 'Voice Storage Enable' is unchecked, and 'Voice Storage Recording Alert', 'Voice Storage Full Alert', and 'Voice Storage Warning Alert' are all set to 'Disabled'. Below this, 'Option Board Enable' is checked. 'Option Board Data Index' is 0. Other options like 'Network Operator Dialling Enable', 'Companding Enable', 'Talkgroup Select Option Enable', and 'Low Level Expansion Enable' are unchecked.

3. If using conventional channels, edit the 'Conventional Personality Data'. In the "Conventional Personality" window, check the "Option Board Enable" box. Check Option Board Enable for all channels if using a button to control the mode of the scrambler. If doing scrambling on a per channel basis, then check Option Board Enable only for scrambled channels. It will be necessary to set the power up state of the scrambler to Scramble for per channel scrambling.

Conventional Personality

Initial Conventional Text String: CONV

Transmit Time-out Time: 60

Display Backlight Mode: Disabled

☐ Acoustic Feedback

☐ Low Level Expansion Enable

☐ Companding Enable

Alert Tone: Variable

☒ Option Board Enable

Variable Alert Volume Offset: 0

Option board Configuration Data Index: 0

☐ Alternative Alert Tone

Fixed Alert Volume: 120

Radio Prompt Language: English

Channel	Frequencies (MHz)		Rx TX	Tx PI
	Receive	Transmit		
1	411.01250	416.01250	Disabled	Disabled
2	464.55000	464.55000	Disabled	Disabled

Be certain to follow standard anti-static procedures when handling any of Midian's products.

Radio Firmware: For the mobile radios listed, it is necessary to have radio firmware version R05.00.00 or higher. If the radio has an older firmware version, it is necessary to upgrade to the newest firmware.

Verifying the firmware version can be done several ways. On most radios, this information is on a label on the bottom of the radio. For display radios, selecting the SoftwareVer# option from the utility menu will report the version. Consult Motorola if you cannot determine the firmware version.

Disassembling the Radio:

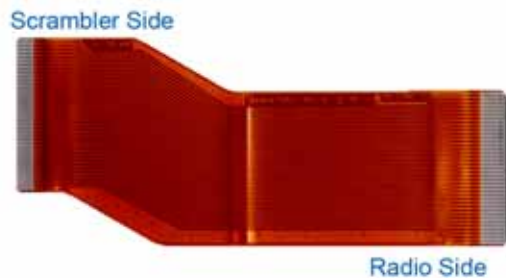
Additional disassembly instructions are also available in Motorola's Basic Service Manual.

1. Disconnect power.
2. Remove plastic cover from the radio chassis by prying the sides away and lifting up.
3. Remove the 6 retaining bolts from the metal lid using a Torx™ size 20 screwdriver. Carefully begin removing the lid. If there is already an option board installed such as a voice storage board, disconnect it by gently lifting the latch holding the 40-pin flex cable in place.
4. Remove the lid completely. Unscrew the three bolts holding the option board frame to the lid if one is present.

Note: It is not recommended to use the radio for transmitting while disassembled, as some model radios require the lid to be installed for RF power.

Installing the Scrambler:

1. Insert the 40-pin flex cable into the 40-pin flex connector on the scrambler, making certain it is seated properly, then close the latch. The silver foil side of the flex should face the edge of the board.



- The scrambler is then mounted into the metal lid of the radio using the option board mounting kit. See pictures below. The mounting kit is ordered from Midian as PRO Option B or from Motorola as RLN4823B. The mounting kit includes the 40-pin flex cable, the mounting frame and 3 mounting screws.



Reassembling the Radio:

Additional assembly instructions are also available in Motorola's Basic Service Manual.

- Once scrambler is installed in the lid, insert the other side of the 40-pin flex cable into the 40-pin flex connector on the radio's main board. The shiny side of the flex should face down.
- Reinstall the metal lid making sure the flex bends toward the back of the radio, otherwise it will be pinched by the lid. Tighten the screws down in number sequence shown on the lid to 17 in lbs (1.9 NM) torque. Repeat to verify torque is correct after completing the sequence.
- Snap on plastic cover.

HARDWARE ALIGNMENT

The MOT-TVS-2-PRO-M series does not require any hardware adjustments, however, when ordering the scrambler, the radio it will be used in must be specified. The scrambler will come modified by Midian for the proper model of radio. If for some reason you decide to modify the board because the radio changes, the table below indicates the parts to change. For example if changing a PRO-M module into a PRO-M MOD-1306; R-3 and R-21 would need to change values.

Scrambler	R-1	R-3	R-8	R-12	R-17	R-21	R-23	R-25	R-36	C-33
PRO-M	750 K	300 K	N/A	62 K	27 K	100 K	150 K	100 K	0 Ohm	N/A
PRO MOD-1306	750 K	750 K	N/A	62 K	27 K	91 K	150 K	100 K	0 Ohm	N/A
PRO MOD-1331	910 K	910 K	27 K	27 K	N/A	47 K	62 K	62 K	N/A	.01 uf

PRODUCT PROGRAMMING

Install the MPS programming software if you have not done so already. The MOT-TVS-2-PRO series version 2.8 and higher can be programmed via the Motorola RIB box.

Start the MPS software. From the product selection screen on the MPS software, locate and select MOT-TVS-2-PRO or MOT-VPU-15-PRO and the desired model and click OK. The following table shows the proper MPS selection based upon the model scrambler ordered.

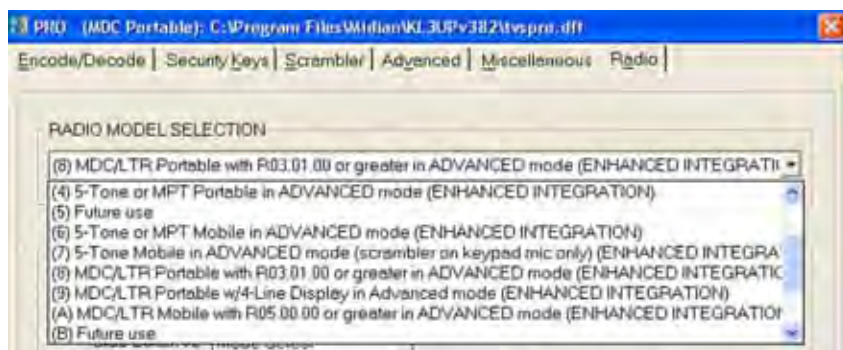
PRO-M (MDC Mobile)	MOT-TVS-2-PRO-M or MOT-VPU-15-PRO-M
PRO-M (LTR Mobile)	MOT-TVS-2-PRO-M MOD-1306 or MOT-VPU-15-PRO-M MOD-1306
PRO-ME (5-Tone or MPT Mobile)	MOT-TVS-2-PRO-M, MOT-VPU-15-PRO-M, MOT-TVS-2-PRO-M MOD-1331 or MOT-VPU-15-PRO-M MOD-1331

- PRO-E (5-Tone Portable)
- PRO-EL (Entry Level Portable)
- PRO (LTR Portable)
- PRO-M (LTR Mobile)
- PRO-M (MDC Mobile)
- PRO (MDC Portable)
- PRO-ME (5 Tone or MPT Mobile)
- PRO-XP
- PRO-XS

Configure the programming software by selecting File->Preferences. Select the appropriate COM port. If using the RIB box, make certain there is a check mark next to 'Rib Box Enable' by clicking on it.

Set the parameters of the MOT-TVS-2-PRO software to fit the application. If any clarifications on a feature are required, move the mouse cursor over the feature name until the question mark appears and right click, an on-line help for that feature will be shown. On the radio tab it is necessary to select the proper Radio Model. If the correct product was selected in the step above then it will be preset in the default file. The following table indicates the proper Radio Model Selection for the scrambler ordered:

(A) MDC/LTR Mobile	MOT-TVS-2-PRO-M, MOT-VPU-15-PRO-M, MOT-TVS-2-PRO-M MOD-1306 or MOT-VPU-15-PRO-M MOD-1306
(6) 5-Tone or MPT Mobile	MOT-TVS-2-PRO-M, MOT-VPU-15-PRO-M, MOT-TVS-2-PRO-M MOD-1331 or MOT-VPU-15-PRO-M MOD-1331



After entering the parameters, save the file by going to File - Save As. Enter the file name in the File Name block and click Save. Saving the file will allow for quick and easy reprogramming of units. Turn power on to the radio and then the RIB. Click ProgramUnit! in the MPS software. You will hear 1-3 beeps from the radio if programmed successfully.

To read the parameters from the scrambler, Click on ReadUnit!.

The radio and RIB should be powered down for 3 seconds after reading or programming.

Important Note: Do not attempt to 'clone' the scrambler by reading one and then programming another. When the scrambler is read, the security codes will be read out as zeroes. If another scrambler is then cloned with this information, the scramblers will be incompatible because they have different security codes. To ensure scramblers communicate with each other, program them from a saved *file*.

Mode Selection: Mode selection means a method of turning the scrambler on and off. In the MOT-TVS-2-PRO and MOT-VPU-15-PRO series there are two ways of doing this:

Per-Channel Scramble On/Off: To use this feature each channel that is designated as a Scrambled channel should have the Option Board Feature box enabled in the radio programming software. Channels that are designated as Clear should NOT have the Option Board feature box enabled. Additionally the Power-Up State in the MPS software should be set to Scramble. When using Per-Channel Scrambling, a button should NOT be programmed for Mode Select in the MPS software.

Scramble On/Off Button: To use this feature each channel should have the Option Board Feature box enabled in the radio programming software. The desired button should be programmed to no function in the radio programming software. In the MPS software on the Radio tab in the Button Assignment area set the desired button to "Mode Select". Pressing and releasing this button will toggle the mode of the scrambler between scramble and clear. A medium tone followed by a high tone indicates the scrambler is in Scramble mode and a medium tone followed by a low tone indicates the scrambler is in Clear mode. Also on the Radio tab under the Miscellaneous section

Code Selection: The TVS-2 or VPU-15 can have up to 4 different codes programmed.

Code Selection Button: To use this feature multiple security codes must be programmed into the TVS-2 or VPU-15 scrambler. The desired button should be programmed to no function in the radio programming software. In the MPS software on the Radio tab in the Button Assignment area set the desired button to "Code Select". Pressing and releasing this button will step the scrambler to the next security code. The scrambler will emit a number of beeps corresponding to the code number the scrambler stepped to (i.e. 2 beeps equals security code 2). The maximum number of codes is 4.

Password: If the password function is enabled the correct password (4 digits using 0-9) must be entered on a compatible numeric keypad on power up. If the correct password is not entered within 5 attempts the unit will be disabled. If the radio does not have a compatible numeric keypad do not enable this feature.

Midian's Kryptic Signaling:

Midian's TVS-2 and VPU-15 offer the following signaling functions:

ANI: When the PTT button is pressed the scrambler will generate an ANI to be decoded by Midian's CAD-300 or DDU-300.

Emergency ANI (ENI): When the Emergency button on the radio is pressed and held for 1 second the scrambler will key the radio and transmit the ENI to be decoded by Midian's CAD-300 or DDU-300.

Selective Call: The scrambler can be selectively called from Midian's CAD-300 or DDU-300. When the scrambler is called it will generate ringing beeps out the radio's speaker.

Radio Kill: The scrambler can be disabled and re-enabled from Midian's CAD-300 or DDU-300. When the scrambler receives a disable command it will not allow any receive or transmit audio to pass through the scrambler or for a PTT command to be given to the radio if the PTT path is controlled by the scrambler. When the scrambler receives an enable command it will resume normal operation.

Spy: The scrambler can be sent a command from Midian's CAD-300 or DDU-300 to key the radio and transmit ambient noise from the microphone for 00-90 seconds in 10 second increments. This time is preprogrammed into the scrambler.

Query: This command sent from Midian's CAD-300 or DDU-300 will report to the CAD or DDU if the scrambler/radio is currently on or off.

Radio Compatibility: Midian has taken the utmost care to ensure the option board integrates into the radio with minimal impact to the features of the radio. However, some features may not be available in the radio when an option board is used. If a feature is not available, please contact Midian to see if the feature can be added.

Radio Firmware: Midian recommends having the latest firmware in the radio when installing the scrambler. However, it should be noted that occasionally firmware updates may cause a conflict with proper option board/radio communications. This may appear that the scrambler is not working properly, but it is a conflict in the serial communication between the option board and radio. If this happens it will be necessary to go back to the original firmware revision.

Please note that firmware versions between the EMEA region and the Asia and America regions might be different.

Scan: Midian strongly recommends not using the radio's Scan function when using voice scramblers. First of all synchronization packets will most likely not be decoded by the receiving radios, as the receiving radio may be looking at a different channel when sync is transmitted. Additionally if using a combination of scrambling on a per-channel basis and a mode select button to control the state of the scrambler, when the scan function is used the radio will ignore the button. This is best resolved by using per-channel scrambling OR a mode select button, but not both. If using scan and a mode-select button the Option Board Feature box in the radio programming section must be enabled on all channels.

Known Issues: The "Enable Wired PTT" function on the "Radio" screen of the MPS UP is obsolete. This box should never be checked. The "Combo (press & hold)" and "Emerg (press & hold)" are not supported on the P1, P2, and P3 buttons when using Enhanced Integration. Use of the System Scan feature of the radio has been known to cause a problem whereby the transmitter stays on the air 3 seconds after PTT is released. Checking the "Reserved Function" box on the "Advanced" screen of the MPS UP works around this radio problem.

Accessory Pin Features: Upon power-up, the radio does not always report the state of the accessory pins to the option board. It may be necessary to toggle the state of these inputs once after power-up to ensure correct operation.

Option Board Feature: Enabling the option board feature tells the radio to report events such as button press, PTT press, carrier detect, etc. to the option board. This feature enables communication between the option board and the radio.

When controlling the scrambler with a radio button, it is absolutely required to enable this feature on all channels. For scrambling on a per channel basis only enable the option board on scrambled channels and the power up mode of the scrambler should be Scramble. On display models, the following icon appears on the LCD when option board mode is on:



Known Issues: The radio must be off for a full 3 seconds prior to being turned on or the scrambler cannot reset properly resulting in malfunction. The "Enable LCD Message" option in the MPS UP should not be enabled due to problems in the radio. If problems are experienced when reading the scrambler from the RIB box, use the MPS cable.

MIDIAN CONTACT INFORMATION

MIDIAN ELECTRONICS, INC.

2302 East 22nd Street
Tucson, Arizona 85713 USA

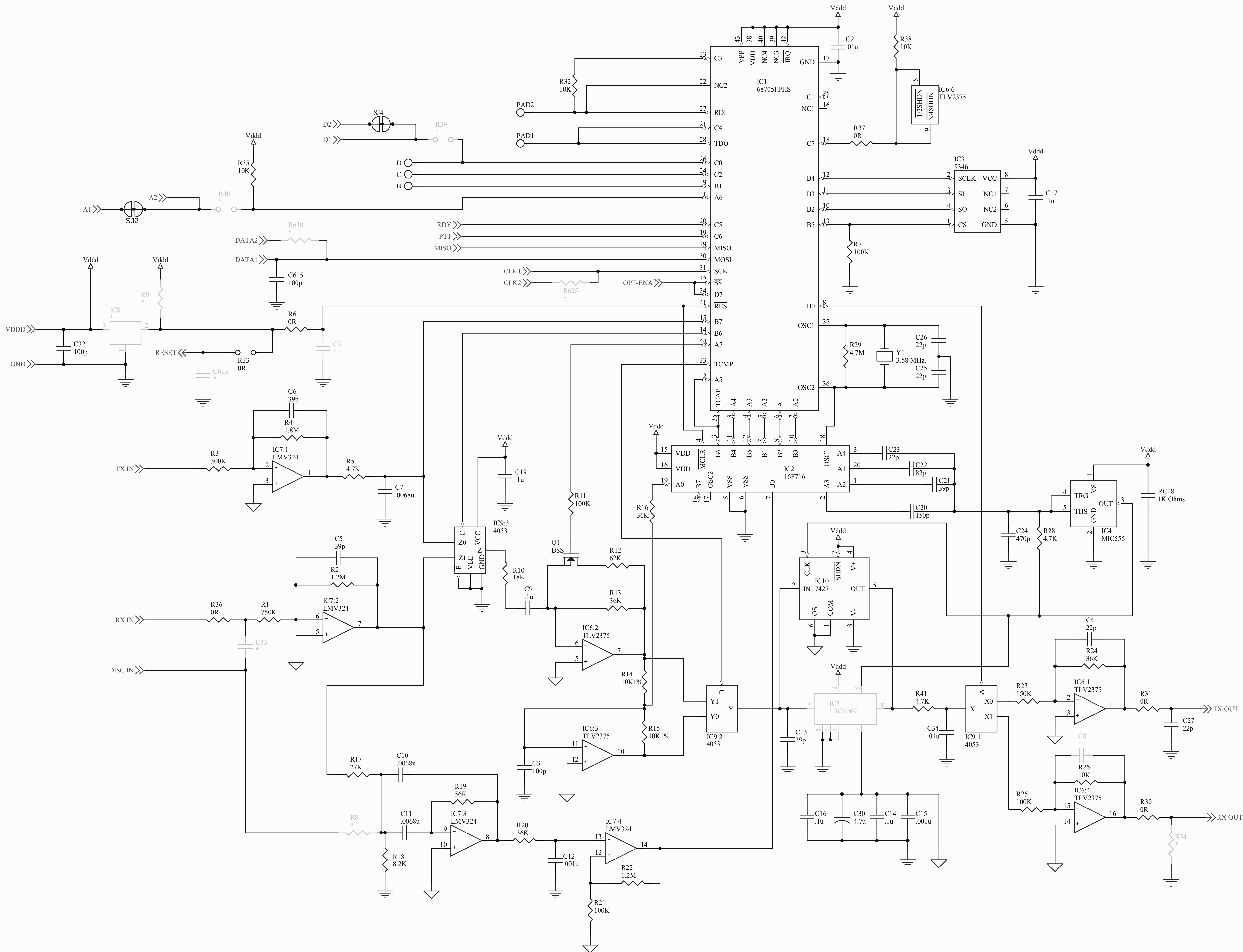
Toll-Free: 1-800-MIDIANS

Main: 520-884-7981

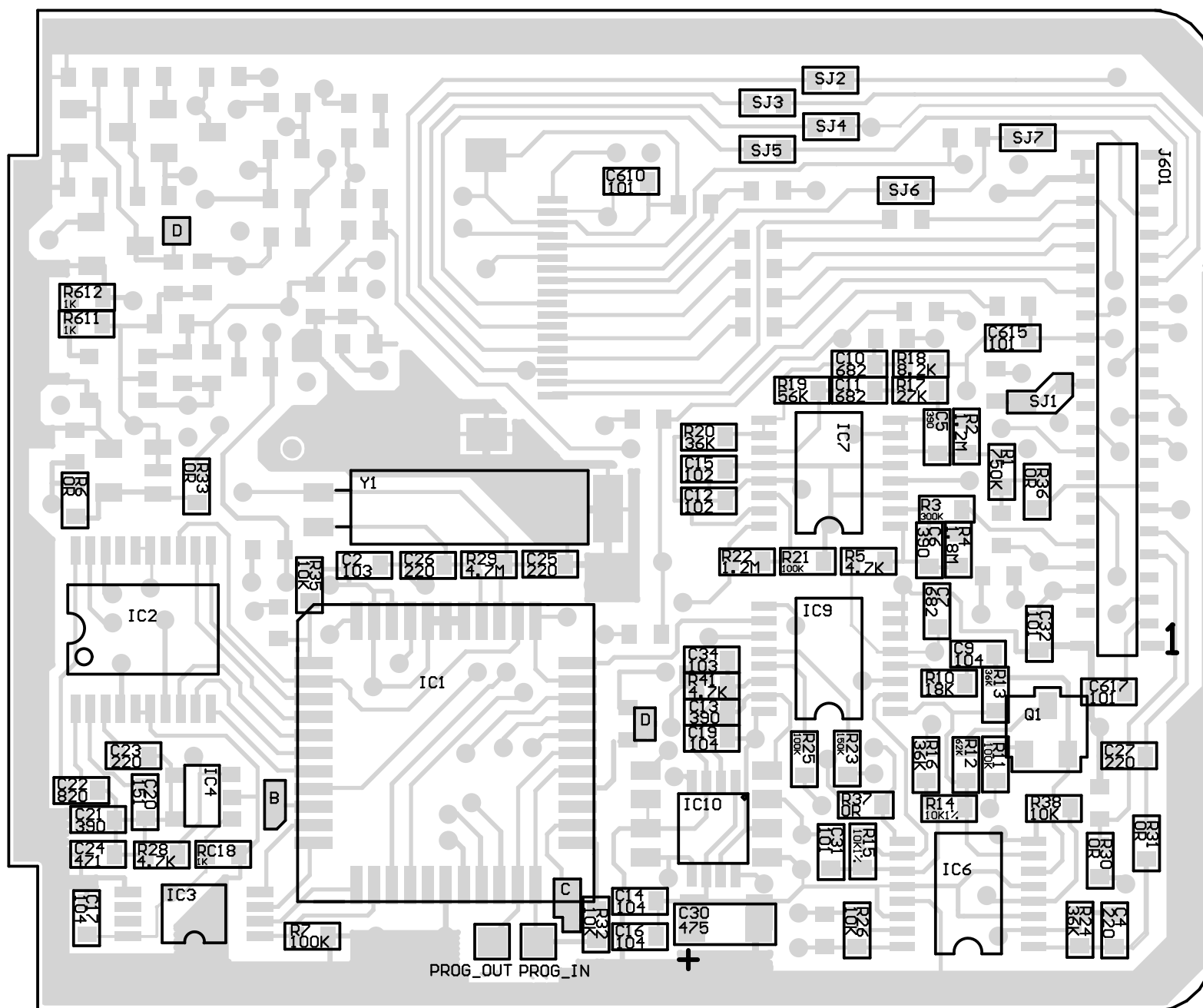
E-mail: sales@midians.com

Web: www.midians.com

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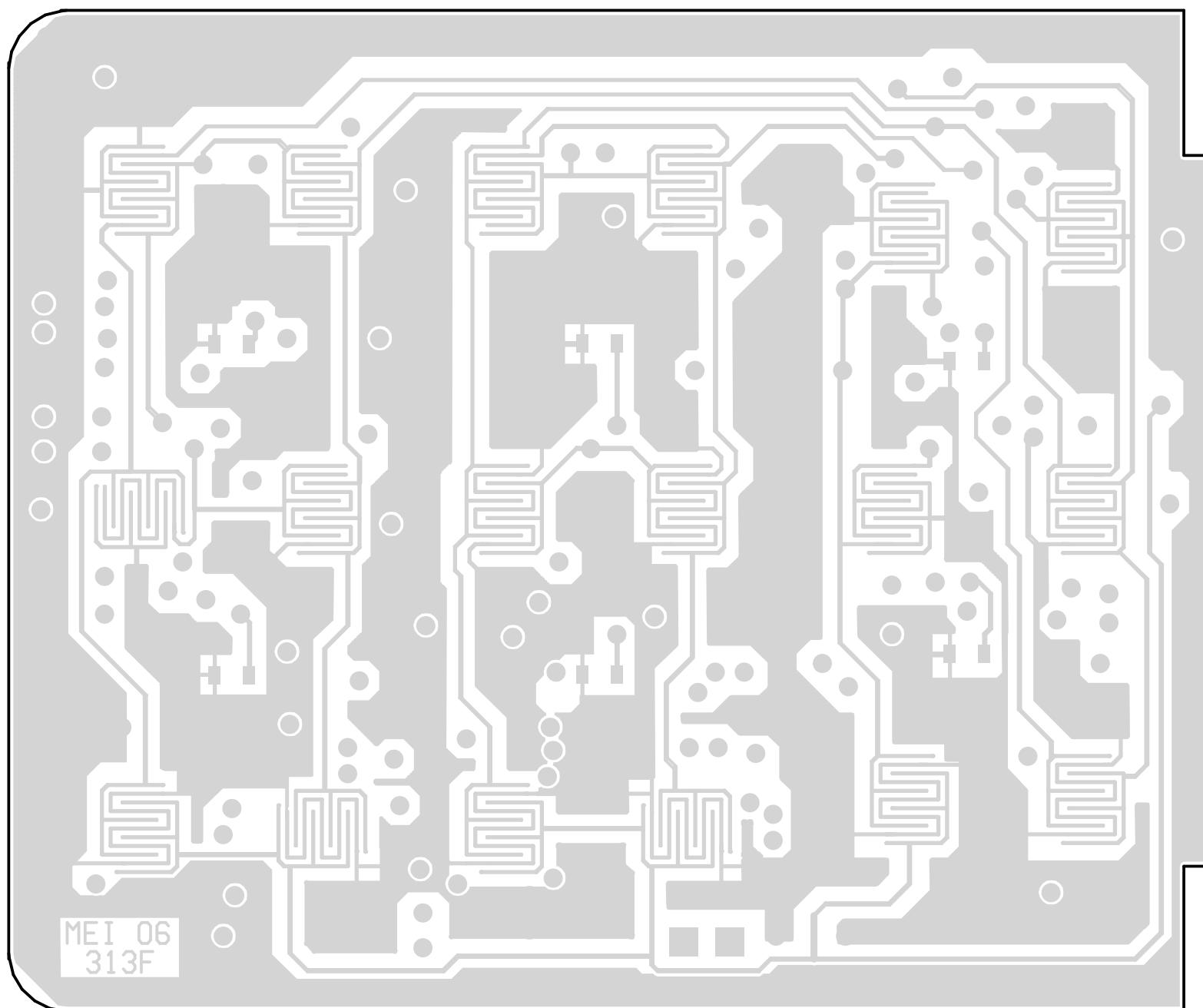


MIDIAN ELECTRONICS, INC.			MOT-TVS-2/MOT-VPU-15 PRO-M	REV H-2	DOCUMENT NAME CP
DATE: 1999-11-01	DWN BY: DML	APPR	SCHEMATIC	SHEET 1 of 2	PROJECT NUMBER 7313
DESIGN: CJS	REV: 2014-05-09		COPYRIGHT © 2012		



*=NOT INSTALLED

MIDIAN ELECTRONICS, INC.			MOT-TVS-2/MOT-VPU-15 PRO-M		REV H-2	DOCUMENT NAME CP
DATE: 1999-11-01	DWG BY: DML	APPR	TOP		SHEET	PROJECT NUMBER
DESIGN: CJS	REV: 2014-05-09		COPYRIGHT © 2012		1 of 2	7313



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DATE: 1999-11-01	DWG BY: DML	APPR
DESIGN: CJS	REV: 2014-05-09	

MOT-TVS-2/MOT-VPU-15 PRO-M	REV H-2	DOCUMENT NAME CP
BOTTOM	SHEET 2 of 2	PROJECT NUMBER 7313
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