



TVS-2-KW2

High Level Hopping Code Scrambler

VPU-15-KW2

Voice Inversion Scrambler with Midian's Kryptic Signaling

Manual Revision: 2018-03-01 Rev B

Covers Software Revisions:

TVS-2: 4.93 & Higher

VPU-15: 4.93 & Higher

This manual & product supports the following radios:

Portables: TK-2170, TK-3170

SPECIFICATIONS

Operating Voltage	7.5 VDC
Operating Current	9 mA
Operating Temperature	-30 - +60 C
Frequency Response	300-2600 Hz
Carrier Suppression	60 dB < Peak Voice
Audio Output Impedance	<1K Ω

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

INSTALLATION OVERVIEW

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

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

GENERAL INFORMATION

TVS-2 Series:

Midian's TVS-2 series is a high-level rolling code scrambler that plugs into Kenwood radios. The TVS-2 uses 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 the CAD-300 or DDU-300. For more information on Midian's TVS-2 please read the TVS-2 Technical Reference Manual.

VPU-15 Series:

Midian's VPU-15 series is an entry level voice inversion scrambler that plugs into Kenwood 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 the CAD-300 or DDU-300.

PRODUCT PROGRAMMING

Midian's TVS-2-KW2/VPU-15-KW2 is programmed using the KL-4F programming interface. Please reference the KL-4F manual for setup instructions of the programming software and hardware.

Go to our website midians.com and under downloads> software, download the latest MPS software version. If using the supplied CD-ROM insert it into the PC's CD-ROM drive. In the browser that will pop-up, install the MPS programming software. Be certain that the "Install KL-4F USB Driver" box is checked during the installation process.

Open Windows' Control Panel and go to Device Manager.

Open Ports (COM& LPT) to identify the port assignment issued by computer. Plug in the KL4F programmer to the USB port and the screen will flash and show the device location.

Open the software and choose product from product tree then set appropriate comport selection in the MPS software as needed

Set the parameters of the scrambler 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, a definition of the feature will be shown.

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.

After the latest MPS has been installed default programming files for specific radio models can be found at:
C:\Apps\Midian\MPS\MPS_vX_xx\Additional Default Files\TVS-2_VPU-15\Kenwood.

KL-4F Programming: Plug the board onto the KL-4F's KW2 connector. Push and hold the power button on the KL-4F and click "Program Unit" in the MPS software. The ACK LED on the KL-4F will flash if programmed successfully.

KL-4F Reading: Plug the board onto the KL-4F's KW2 connector. Push and hold the power button on the KL-4F and click "Read Unit" in the MPS software.

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*.

HARDWARE INSTALLATION

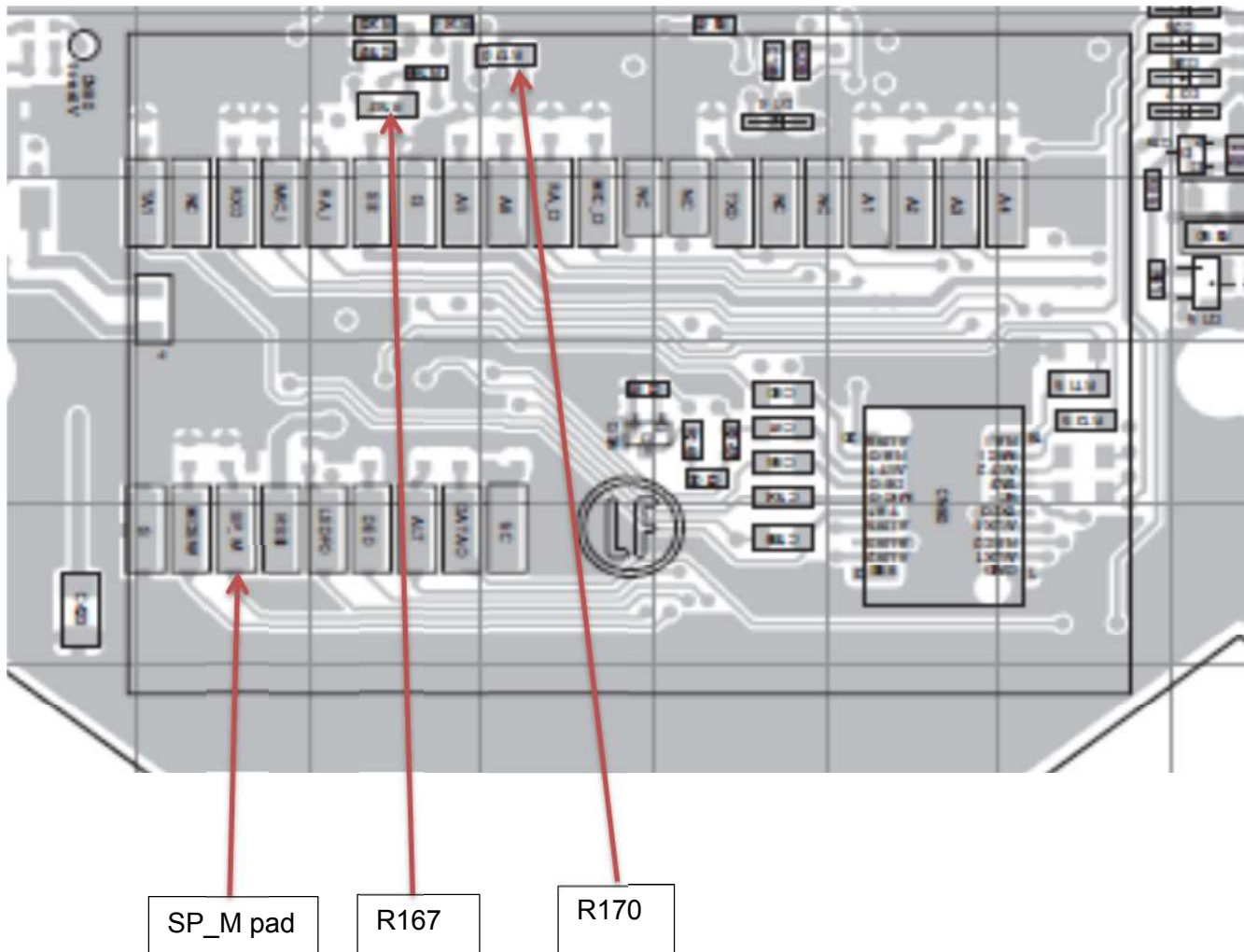
Be certain to follow standard anti-static procedures when handling any of Midian's products.

TK-2170/3170:

This radio requires radio firmware version 1.22.00 (checksum 08C3) or higher.

Plug the unit into the options connector located behind the options door under the battery. Before plugging the unit in, remove R-170 to open the radio's TX path and R-167 to open the radio's RX path.

COR is recommended to mute the initial sync packet and for auto descramble. If COR is desired it will be necessary to install a wire from the scrambler into the radio. This wire should be installed on the scrambler at the hole marked "COR wired" please see pictorial at end of this manual for location of "COR wired" connection point. The wire should then be connected to the radio's pad labeled SP_M. If COR is being used, the scrambler's "COR In Polarity" should be programmed as "Lo", otherwise program as "Hi". The Audio Enable Polarity should be programmed as Lo.



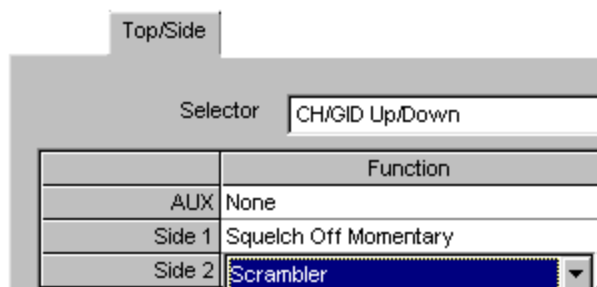
RADIO PROGRAMMING

TK-2170/3170: This radio requires KPG-101D v 2.20 or higher for programming.

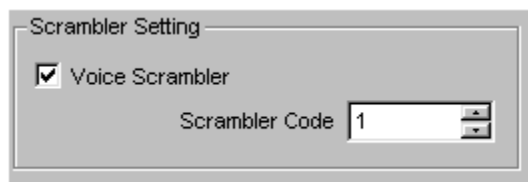
Under the “Model” menu select “Product Information” and set “Optional Board” to “Voice Scrambler”.

Under “Edit” “Extended Function” enable the “Echo PTT”.

Under the “Edit” menu select “Key Assignment” and set “Side 1” or “Side 2” under the “Top/Side” tab as “Scrambler”. This will set the “Side 1” or “Side 2” button as the mode select button.



If scrambling on a per channel basis is desired or a combination of a mode button and per channel, then from the “Zone Information” screen click on the “Channel Edit” button. Under “Scrambler Setting” enable the “Voice Scrambler”. For scrambling on a per channel basis, this will need to be done for each channel where scrambling is desired. If the box is checked, the radio will power up in coded mode & when that channel is selected. When per channel scrambling is used, it is still possible to toggle in and out of scramble mode.



If the scrambler will be used with multiple codes, then select which code (1-4) that is desired for that channel under “Scrambler Setting” “Scrambler Code”.

OPERATION

Mode Select: Press the radio key that was assigned in the radio programming. A tone will be emitted from the radio and the ◇ symbol will appear on the display of the radio indicating scramble mode. If scrambling on a per channel basis is being used, then switching between a scrambled or non-scrambled channel will cause the ◇ symbol to appear or disappear.

Code Select: Different codes can be accessed by setting the desired scrambler code (1-4) for a radio channel using the “Scrambler Setting” under the “Zone Information” screen’s “Channel Edit” button. Switching to the various channels can supply the user with the desired code. The TVS-2 should be programmed with the same number of security codes as are programmed into the radio. The TVS should have the keypad programmed as “2-Line Binary” under the “Input/Output” tab.

Communications: Once the desired mode has been selected, press and hold the PTT. The scrambler will generate a scrambled or clear synchronization packet to tell receiving radios whether to go to scramble or clear if Automatic Detection is enabled. Once the sync packet is transmitted a go-ahead beep is heard to indicate that it is okay to start the conversation.

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 ANI 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.

TECHNICAL NOTES

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.

LTR Trunking: Midian's TVS-2-KW2 and VPU-15-KW2 have not yet been tested in the trunked radio versions.

Emergency ANI: ENI is currently not supported by the Kenwood radio without the installation of a wire. Solder a wire from "EMERG_IN" on the scrambler to the radio junction of L-2 and C-29. The AUX button on the radio should be programmed as "None".

MIDIAN CONTACT INFORMATION

Midian Electronics Inc.

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Tucson, Arizona 85745 USA

Orders: 1-800-MIDIANS

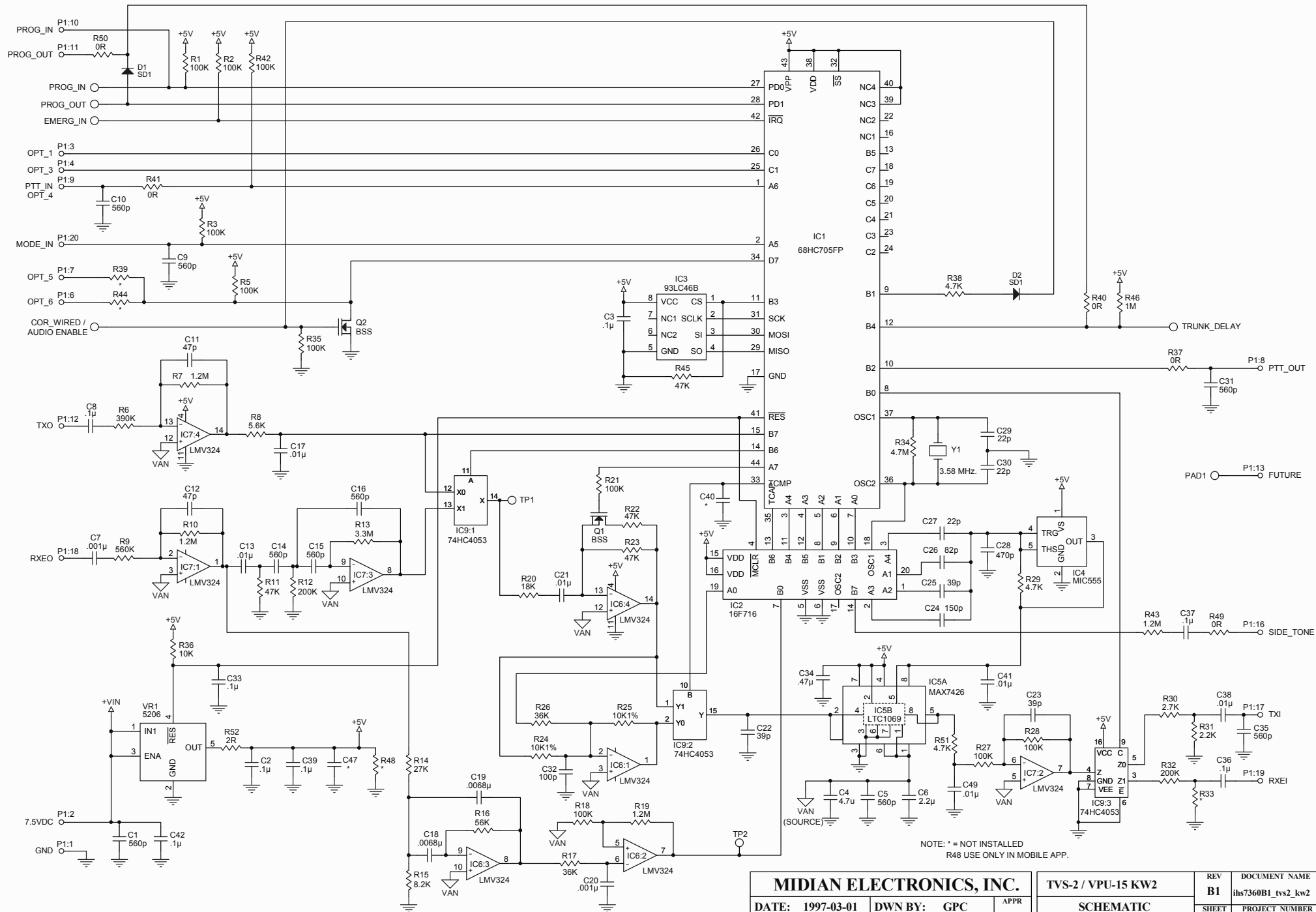
Phone: 520-884-7981

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E-mail: sales@midians.com

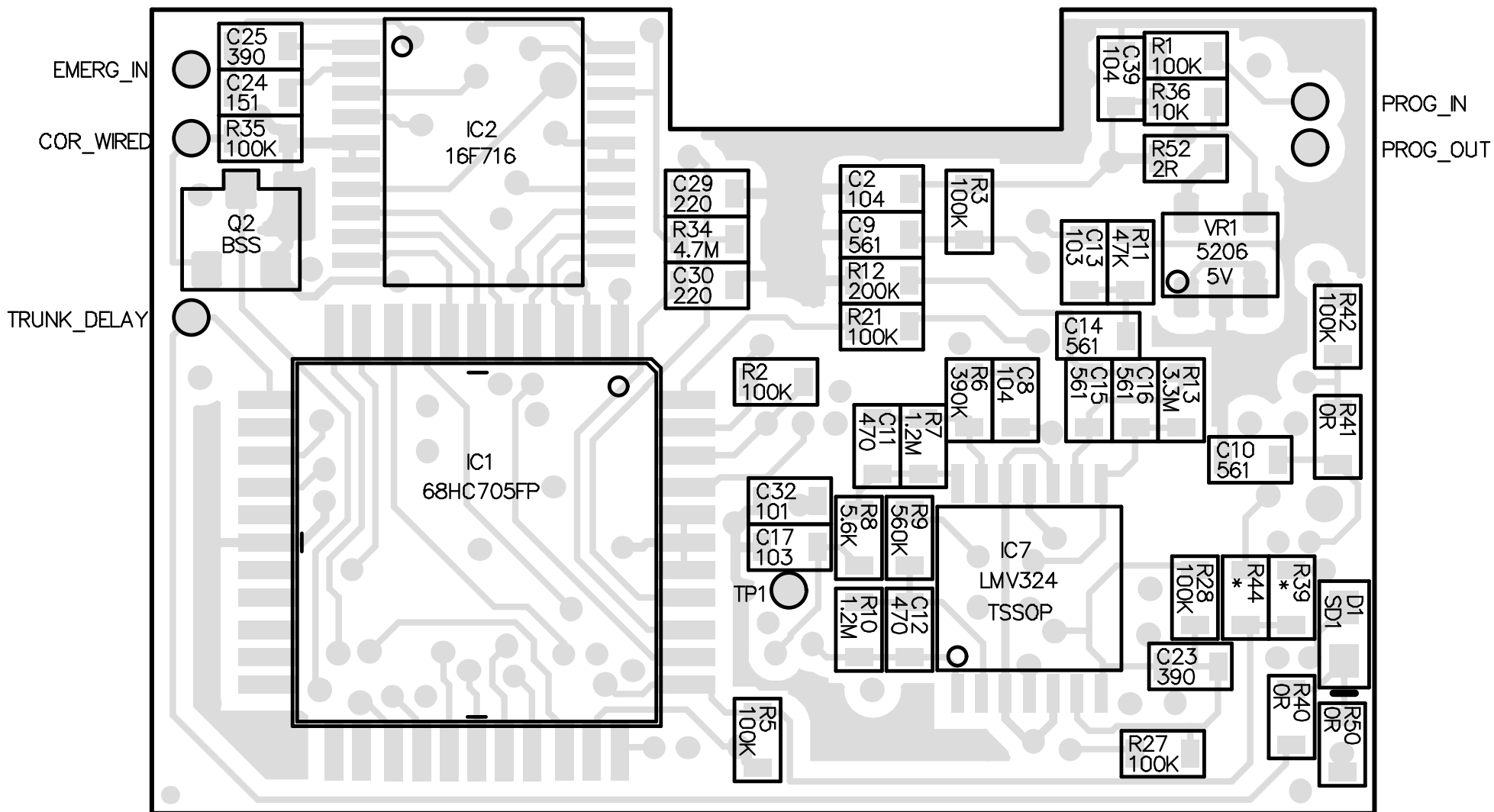
Web: <http://www.midians.com/>

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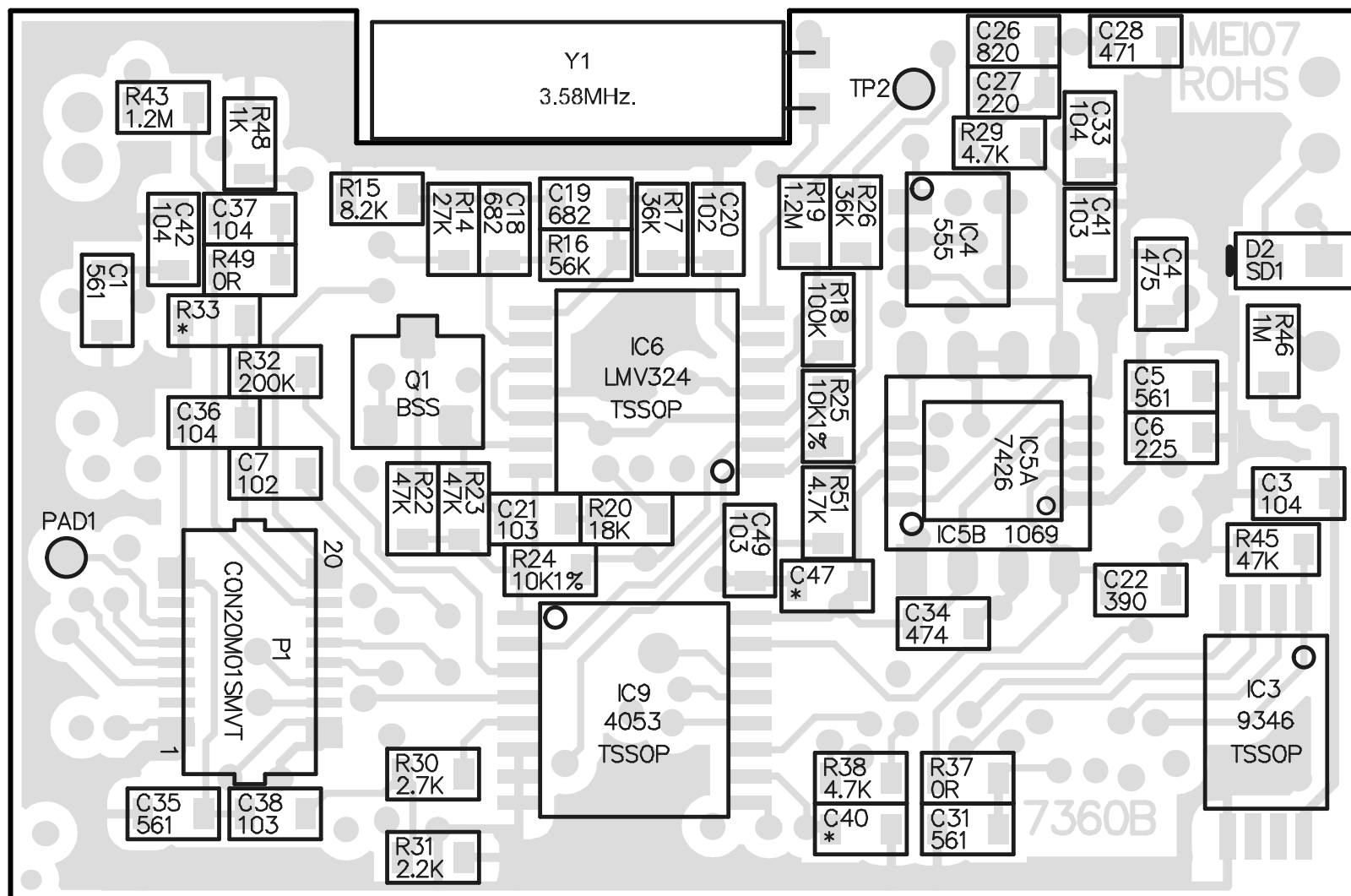
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