PR-10

Tone and Voice Paging Regenerator

Simplex Repeater Maker

Manual Revision: 2010-09-01

Covers PCB Revisions:
B

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SPECIFICATIONS

Voltage/Current:

External Power	12-18 VDC
Standby Current with Power LED	5 mA
Current with COR or PTT LED	6 mA

Radio Inputs/Outputs:

AGC Dynamic Range	50 db
Audio Output Level	30 mVpp or 3.0 Vpp
Audio Output Impedance	1 k or 47 k Jumper Selectable
PTT Out:	Open-Collector – Logic Low

Mechanical:

Dimensions:	1.45" H x 6.1” W x 7.0" L
Operating Temp:	-30° to +60° C

GENERAL INFORMATION

Midian's PR-10 is a simplex store and forward repeater (aka simplexor or parrot) and paging regenerator that supports retransmitting of both tone and voice similar to the discontinued Zetron Model 19.

Simplex Repeater Mode:

The PR-10 can be connected to a simplex mobile or base station to create a simplex store and forward repeater. When the PR-10 sees a busy indication from the connected radio it will start recording the received audio. When the busy indication goes away for a programmed amount of time, the PR-10 will key the radio and retransmit the recorded audio. The following are applications for the PR-10 as a simplex repeater:

- Expand radio coverage into remote locations, valleys, tunnels, buildings (hospitals, campuses, etc), downtown areas and more.
- Evaluate potential radio site or coverage problems by connecting the PR-10 to a mobile radio. A technician can then drive through the desired coverage area, key up and transmit voice, unkey and listen to the repeated audio quality.

Selective Repeat Mode:

The PR-10 has a tone decoder on the board that can be programmed to decode 2-Tone, DTMF, 5-Tone or Pulse Tone (1500 Hz or 2805 Hz for HEAR Systems). When the tone decoder decodes the programmed sequence(s) it will give a validate output to the PR-10. The validate confirms to the PR-10 that the PR-10 should repeat the incoming audio. The tones will also be retransmitted. The following are applications for the PR-10 as a selective simplex repeater:

- Retransmit 2-tone or DTMF pages for fire departments into remote areas or buildings with poor coverage.
- Retransmit Pulse Tone pages from ambulances in remote areas with poor coverage to hospitals (HEAR Systems).

Announcement Mode:

The PR-10 can be programmed to repeat the last received audio message continuously at programmable intervals, applications include:

- Broadcasts for road or weather conditions
- Aviation authority broadcasts for pilot information (ATIS – Automatic Terminal Information Service)

PR-10 Features:

- Up to 180 seconds of record time for message playback
- COR or VOX operation
- Supports 2-Tone, DTMF, 5-Tone and Pulse Tone decoding for validating and regenerating paging

PR-10 Benefits:

- Low cost alternative for expanding radio coverage
- Existing licenses can be used

HARDWARE INSTALLATION

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

Use the enclosed matching cables with RJ45 type connectors to plug into the PR-10. The other ends can be connected to the appropriate type of radio connector using the pin out and color codes show below. See connector pin out in the chart below.

Midian offers several pre-made cables for plug and play operation for certain radios. Contact sales for further information.

J3-1: Validate (Brown): This is an external validation for the PR-10 to retransmit the page. The PR-10 has its own internal validation using 2-Tone, DTMF, 5-Tone or Pulse Tone signaling.

J3-2: External Enable (Blue): Future Use.

J3-3: Mic audio (White): Connect to the MIC-High in the base station radio.

J3-4: Ground (Black): Connect to ground in the base station radio.

J3-5: COR Input (Red): Connect to a point in the radio's squelch or CTCSS circuit that changes logic level when a carrier is detected. The unit defaults to look for an active low. If programmed for an active high the LED will be on when COR is inactive and off when it is active.

J3-6: External Power (Green): Connect to a 12-18 VDC source in the base station radio. If power cannot be connected to the radio use the optional wall adaptor (12-18 VDC).

J3-7: PTT Output (Yellow): This open collector provides a ground during PTT. Connect this to the PTT of the base station radio.

J3-8: Speaker – (Violet): Connect to Speaker - of the base station radio. If the speaker uses a common ground do not connect the Violet wire.

J3-9: Speaker + or Single Ended Speaker High (Orange): Connect to Speaker + of the base station radio.

J3-10: Trunking Delay (Gray): Connect this to a point in the base station that gives a change of state when a channel is acquired. The unit defaults to look for an active low. If programmed for an active high the LED will be on when the trunk delay is inactive and off when it is active.

PRODUCT PROGRAMMING

Jumper Settings:

The following table shows the default jumper settings and their function:

Jumper	Default	Description
JP1	Out	Ground for PTT Input on Tone Decoder. Install for Tone Decoder programming and remove when completed
JP2	In	Future Use
JP11	Out	Radio Output Audio Impedance (In = 1 K Ohm - Out = 47 K Ohm)

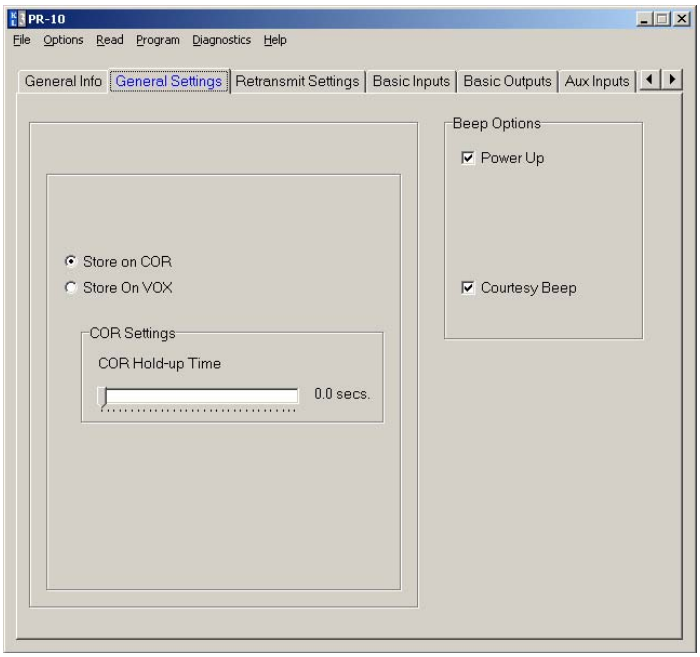
Programming:

The PR-10 is programmed using Midian's KL-3 and KL-3 Option A programming cables and the KL-3 software. Please reference the KL-3 manual for programming cable and software setup. Note that when programming the PR-10 there are 2 programming files that need to be downloaded to the unit when using the selective repeat capabilities, the PR-10 and PR-10 Tone Decoder files from the KL-3 product selection tree.

The PR-10 must have the programming file sent to the unit within 15 seconds of powering the unit. Cycle power after programming.

When programming the tone decoder JP1 must be installed (with the power off). Apply power and the tone decoder must have the file sent to the unit within 5 seconds of powering the unit. Remove JP1 after programming the tone decoder. Cycle power after programming.

General Settings Tab:



Store on COR/Store on VOX: Select the appropriate method that the PR-10 should use to start recording incoming audio.

COR Hold-Up Time This sets the amount of times after a loss of COR or VOX that the unit will wait until it retransmits the recorded audio.

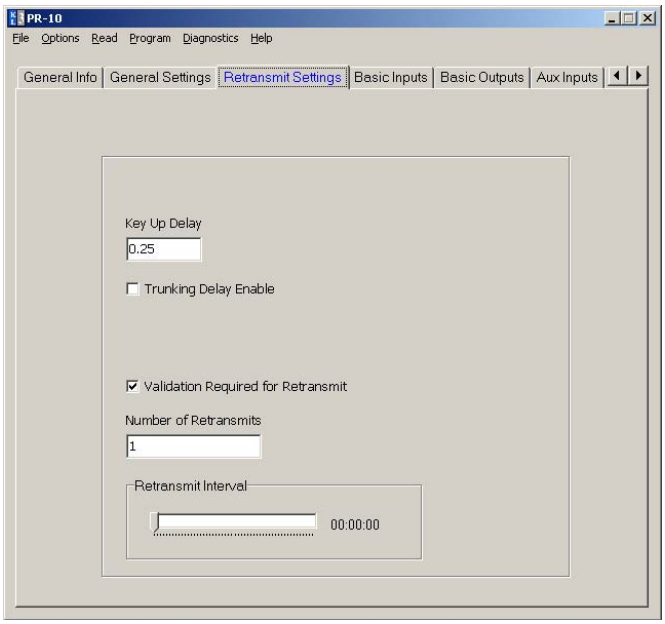
VOX Settings > Sensitivity: This is a threshold detection based on the energy level in the audio.

VOX Settings > Attack Time: This sets the minimum time before the PR-10 will detect VOX based on the sensitivity setting.

VOX Settings > Decay Time: This sets the time before the PR-10 will drop the VOX detection. Be certain to set this long enough so that you do not have drop outs between words or on brief pauses.

Beep Options > Courtesy Beep: If selected, once the unit is done retransmitting the recorded audio it will generate a courtesy tone to let others know it is done retransmitting.

Retransmit Settings Tab:



Key-Up Delay: This sets the amount of time the PR-10 waits after keying the base station radio before it starts to retransmit the recorded audio.

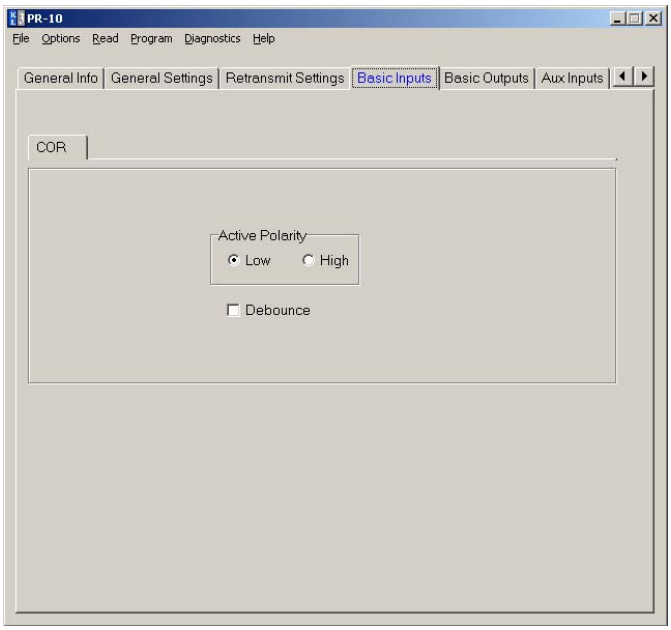
Trunking Delay Enable: Check this box if using a trunking system. This will cause the PR-10 to hold off regenerating the recorded audio until the PR-10 has received a channel acquisition acknowledgement from the base station radio.

Validation Required for Retransmit: If checked the PR-10 will only retransmit messages once it has received a logic low from the internal tone decoder or from an external source.

Number of Retransmits: This sets how many times the PR-10 will retransmit the last recorded audio clip.

Retransmit Interval: This sets the time interval between the retransmits set in the Number of Retransmits field.

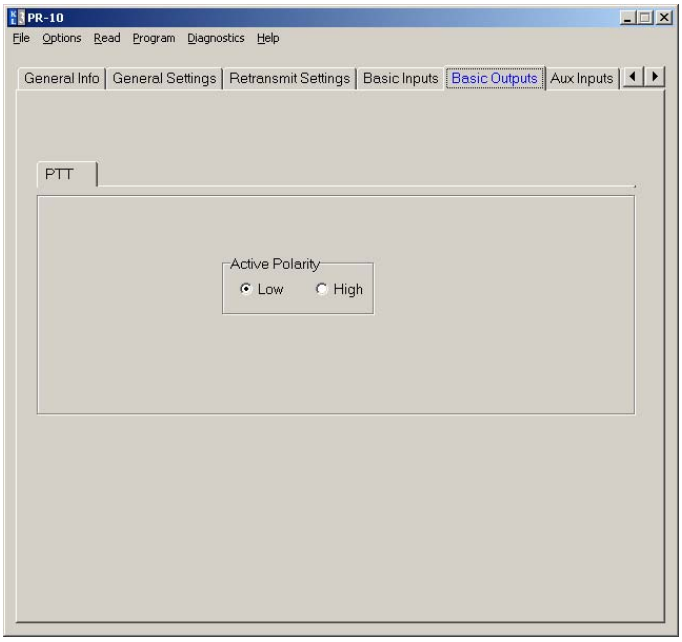
Basic Inputs Tab:



COR > Active Polarity: This sets whether the PR-10 looks for an active low or active high to start recording the received audio. **Note:** The associated COR LED, when programmed for an active low, will be off when COR is inactive and on when COR is active. However, the COR LED, when programmed for an active high, will be on when COR is inactive and off when COR is active.

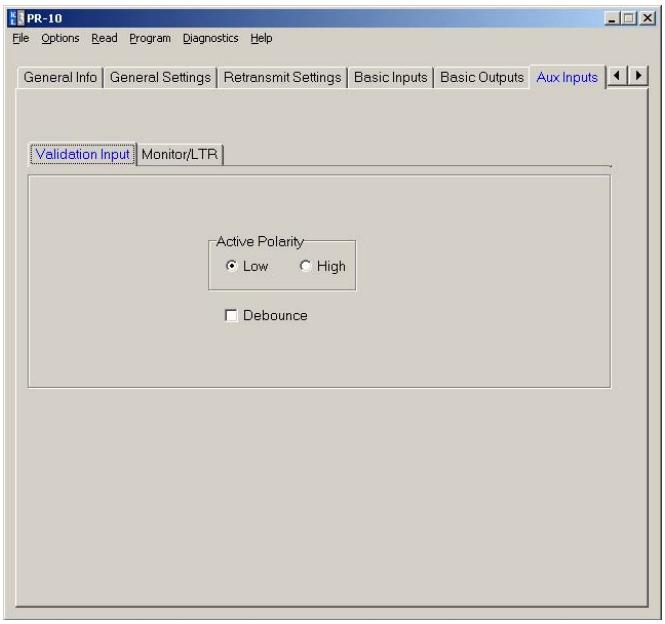
COR > Debounce: If checked the PR-10 will require a continuous active state for 40 msec before accepting the COR.

Basic Outputs Tab:



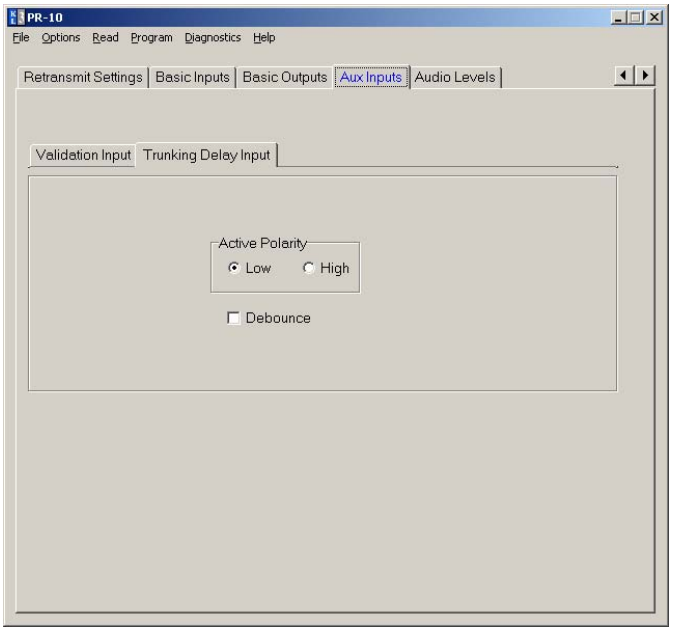
PTT > Active Polarity: This sets whether the PR-10 gives an active low or active high to key the connected radio.

Aux Inputs Tab:



Validation Input > Active Polarity: This sets whether the PR-10 looks for an active low or active high to validate a decode from the internal tone decoder or an external validate. Note: The internal tone decoder uses an active low polarity.

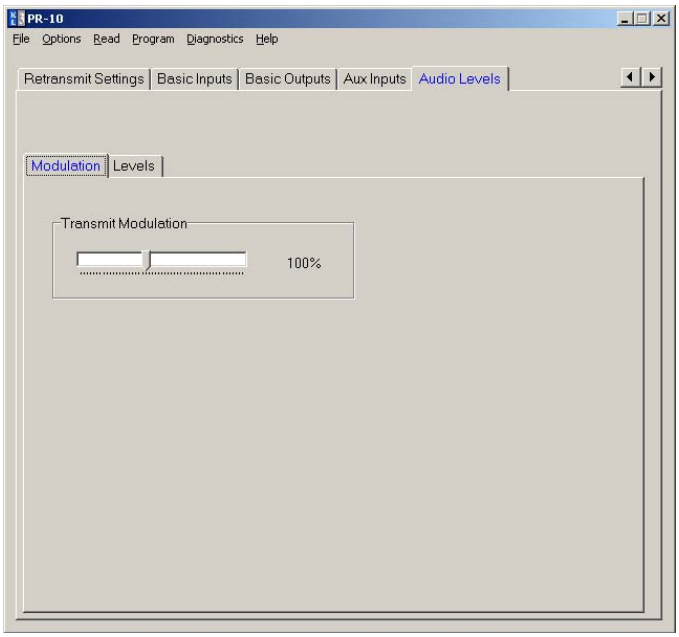
Validation Input > Debounce: If checked the PR-10 will require a continuous active state for 40 msec before accepting the validation.



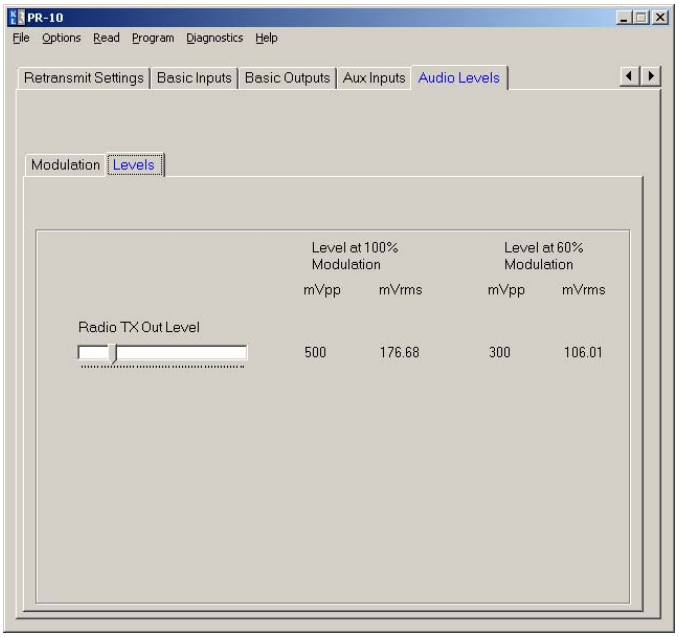
Trunking Delay Input > Active Polarity: This sets whether the PR-10 needs an active low or active high indication from the radio to indicate a trunked channel has been established. **Note:** The associated Ch. Acq. LED, when programmed for an active low, will be off when trunking input is inactive and on when trunking input is active. However, the Ch. Acq. LED, when programmed for an active high, will be on when trunking input is inactive and off when trunking input is active.

Trunking Delay Input > Debounce: If checked the PR-10 will require a continuous active state for 40 msec before accepting the channel acquisition.

Audio Levels Tab:



Modulation > Transmit Modulation: This sets the modulation level of the retransmitted voice relative to the Radio TX Out Level below.

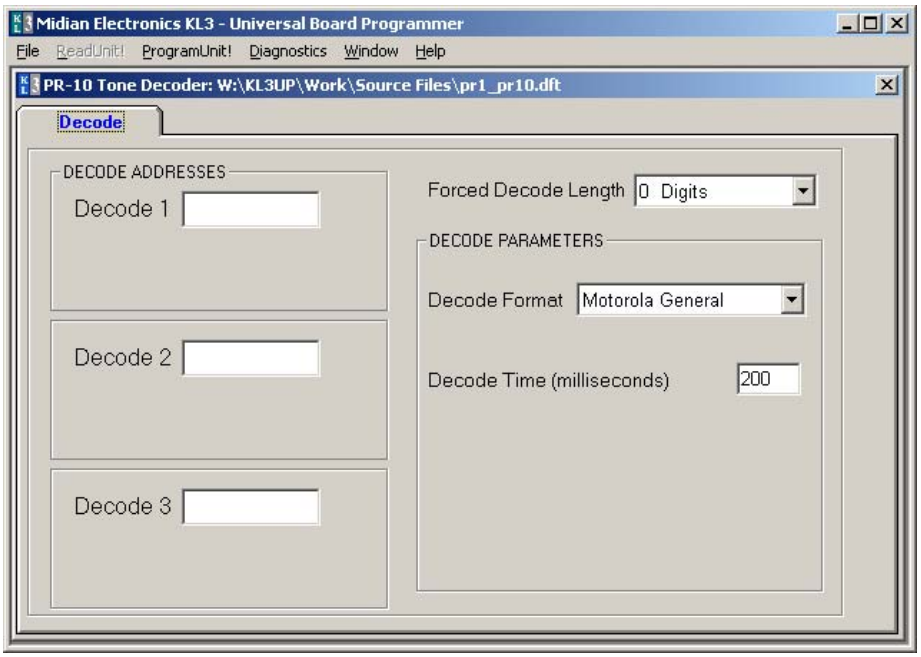


Levels > Radio TX Out Level: This sets the transmit output audio level of the PR-10 to the base station radio. Start by opening impedance jumper JP-11 and programming the PR-10 with the “Radio TX Out Level” set to 499mVpp under the 100% modulation heading. The “Radio TX Out Level” needs to be set low so that the transmitter is modulated below its maximum deviation, you can then slowly increase the “Radio TX Out Level” to the point where the limiter in the radio keeps you from increasing the deviation any more.

Using a service monitor, send a full quieting signal, modulated with a 1 KHz tone at 100% of maximum system modulation, 5 kc for wide band or 2.5 kc for narrow band. Allow the PR-10 to record enough audio to check the modulation of the transmitter. When the receive signal is removed and the PR-10 has caused the transmitter to begin transmitting, check the deviation of the transmitter using the service monitor. If the deviation is below the full system deviation, adjust “Radio TX Out Level” up by approximately 500 mV p-p increments until full system

deviation is obtained. Once full system deviation is obtained adjust “Radio TX Out Level” down by 100mVpp increments until you see a drop in full deviation, at that point start going up with the “Radio TX Out Level” one step at a time (approximately 15 mV p-p) until full system deviation is obtained again. This level should now be at point where the limiter just starts to limit deviation.

PR-10 Tone Decoder Programming Parameters:



The PR-10 offers predictive and non-predictive decode methods as follows:

Predictive Decode: Upon decode of one of the 3 tone sequences programmed into the decode registers, the unit will validate the page.

Example: Decode Register 1 is programmed for cap code 112 and Decoder Register 2 is programmed for cap code 129 with a Decode Format of Motorola General. When cap code 112 or 129 is decoded, then the page will be validated. However if a non-programmed cap code such as 115 is decoded it will not be retransmitted.

Non-Predictive Decode: By leaving the 3 decode registers blank, the PR-1 will decode any tone sequence within the programmed Decode Format.

Example: Decode Registers 1, 2 and 3 are left blank with a Decode Format of Motorola General. When any cap code within the Motorola General code plan is decoded, then that page will be validated.

Decode 1/Decode 2/Decode 3: Enter the desired cap code(s) or tone sequence(s) into these 3 decode registers. For non-predictive decoding leave these fields blank.

Forced Decode Length: This field can be set for 0-8. Entering a 0 enables the unit to decode a sequence of any length (1-8 characters). If set for 1-8 digits then it will only decode sequences that match that length.

Decode Format: Select the desired format that the tone sequences are derived from (i.e. Motorola General, GE Type 99, DTMF, CCIR, etc.).

Decode Time: We recommend using the following timings:

5-tone: 5 msec for 30-45 msec tones or 10 msec for 50-100 msec tones
Pulse Tone (1500 & 2805 Hz): 10 msec
2-tone: 200 msec for 1 sec/3 sec encode timing
DTMF: 1 sec

Note: 5-Tone should not be encoded at a rate faster than 30 msec per tone, as the reliability decreases.

CONTROLS & INDICATORS

Power Switch: In the up position the PR-10 is on.

Power LED: This red LED indicates that power is applied to the unit and that the switch is on.

COR LED: This yellow LED indicates that the PR-10 is receiving a busy indication from the radio. **Note:** The COR LED, when programmed for an active low, will be off when COR is inactive and on when COR is active. However, the COR LED, when programmed for an active high, will be on when COR is inactive and off when COR is active.

PTT LED: This green LED indicates that the PR-10 is applying push to talk to the radio.

CH ACQ LED: This red LED indicates that the radio has acquired a channel on the trunk system and it is okay for the PR-10 to retransmit the page.

DTMF LED: Future Use.

Validate LED: This green LED indicates that the PR-10 Tone Decoder has validated an incoming page.

OPERATION

Simplex Repeater Mode:

When used in this mode, the PR-10 will record and retransmit all incoming audio.

When the COR input goes active the PR-10 will start recording the incoming audio. After the COR input goes inactive and the programmable COR dropout time ends the PR-10 will issue a PTT output to the radio and retransmit the audio. If COR is not available VOX detect can be used.

Selective Repeater Mode:

When used in this mode, the PR-10 will record and retransmit incoming audio that has been validated by the 2-Tone, DTMF, 5-Tone or Pulse Tone decoder.

When the COR input goes active the PR-10 will record the incoming audio. After the programmable COR input goes inactive and the programmable COR dropout time ends the PR-10 will issue a PTT output to the radio and retransmit the paging tones and audio if the PR-10 receives a validate. If COR is not available VOX detect can be used.

The PR-10 offers predictive and non-predictive decode methods as follows:

Predictive Decode: Upon decode of one of the 3 tone sequences programmed into the decode registers, the unit will validate and retransmit the page.

Example: Decode Register 1 is programmed for cap code 112 and Decoder Register 2 is programmed for cap code 129 with a Decode Format of Motorola General. When cap code 112 or 129 is decoded, then the page will be validated and retransmitted. However if a non-programmed cap code such as 115 is decoded it will not be retransmitted.

Non-Predictive Decode: By leaving the 3 decode registers blank, the PR-1 will decode any tone sequence within the programmed Decode Format.

Example: Decode Registers 1, 2 and 3 are left blank with a Decode Format of Motorola General. When any cap code within the Motorola General code plan is decoded, then that page will be validated and retransmitted.

Announcement Mode:

When used in this mode, the PR-10 will record and retransmit incoming audio continuously at preprogrammed repeat intervals.

When the COR input goes active the PR-10 will start recording the incoming audio. After the COR input goes inactive and the programmable COR dropout time ends the PR-10 will issue a PTT output to the radio and retransmit the audio. The PR-10 will repeat the last recorded audio message continuously at the preprogrammed repeat interval. If COR is not available VOX detect can be used.

TECHNICAL NOTES

No technical notes are available at this time.

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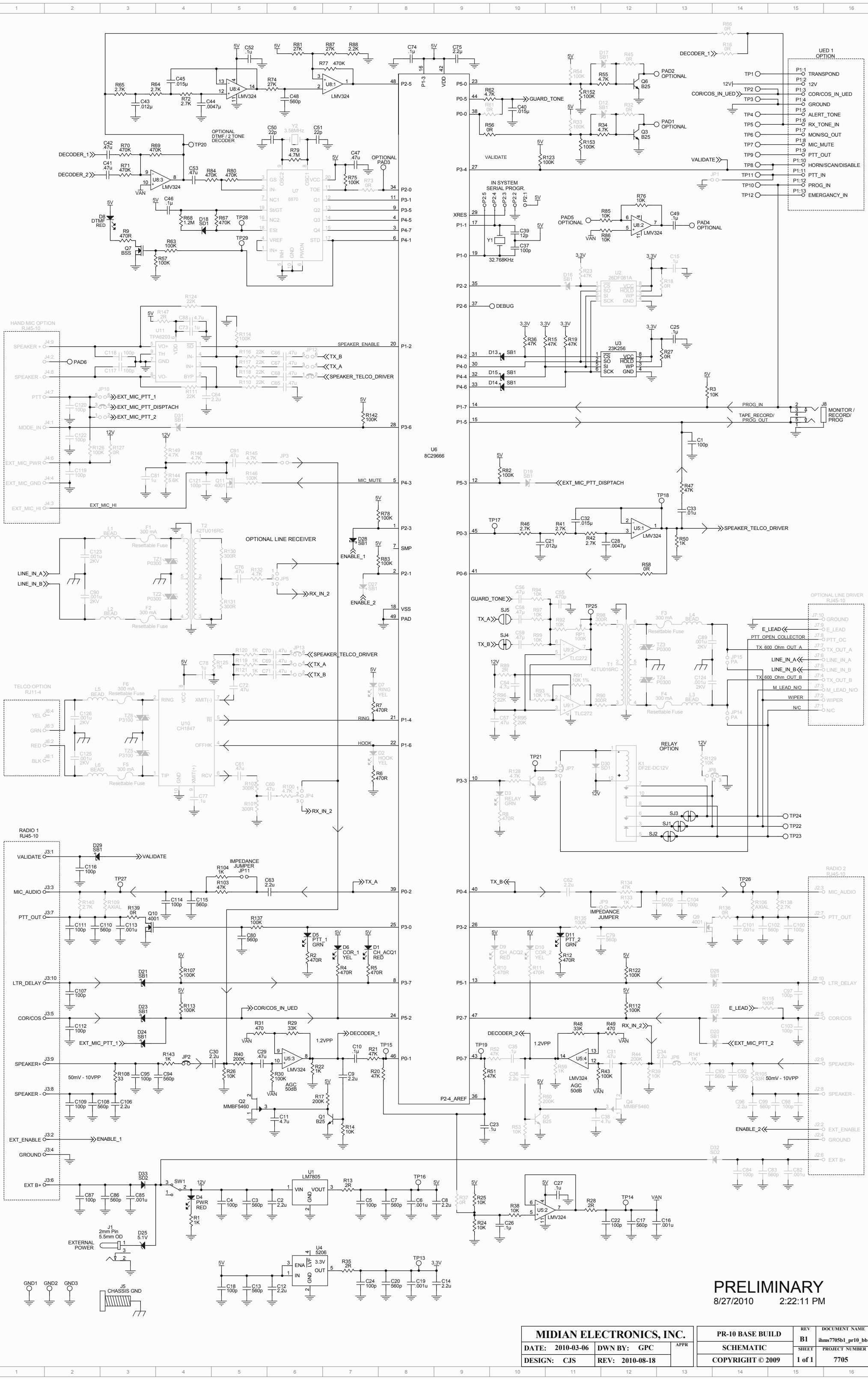

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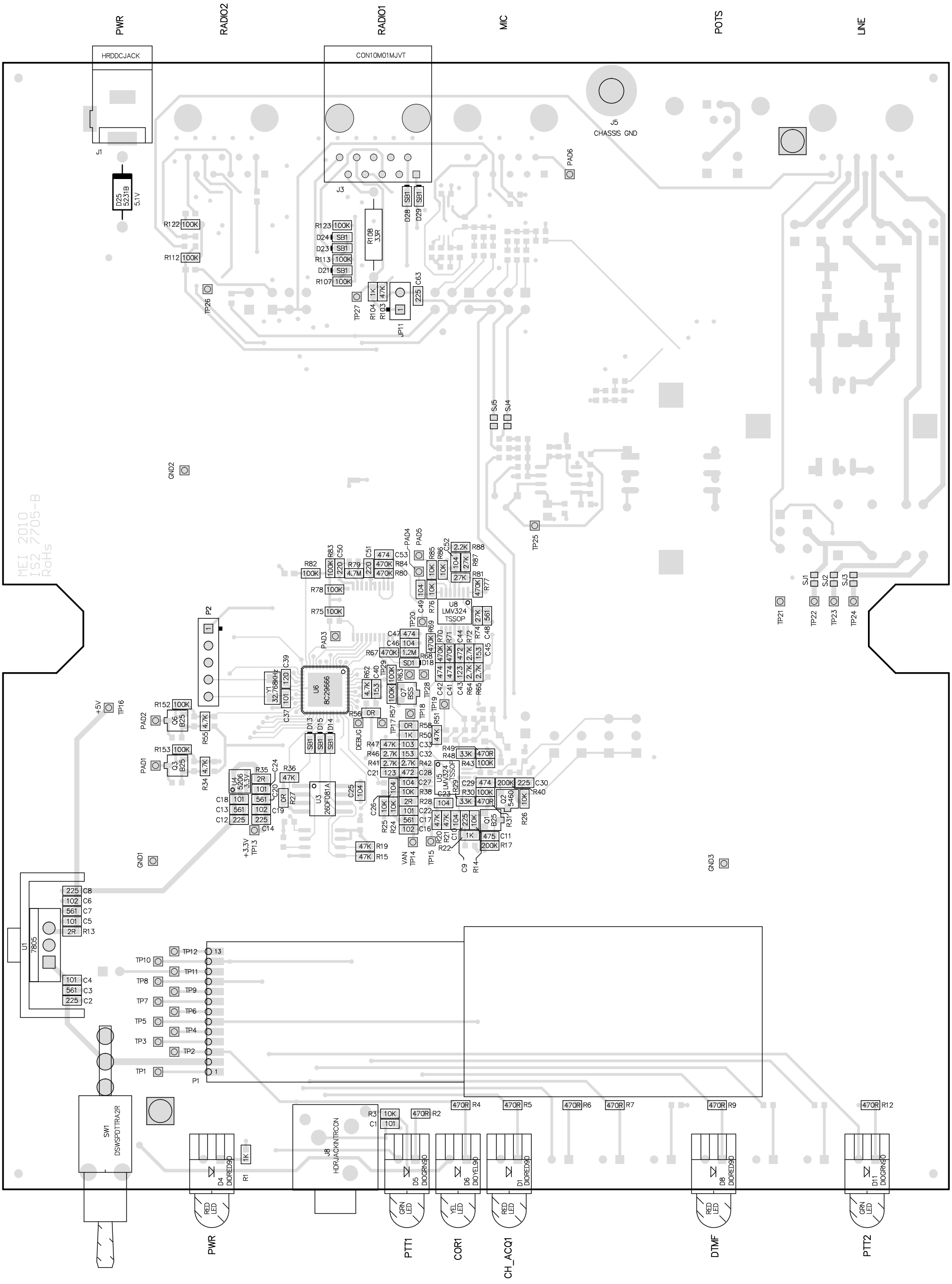

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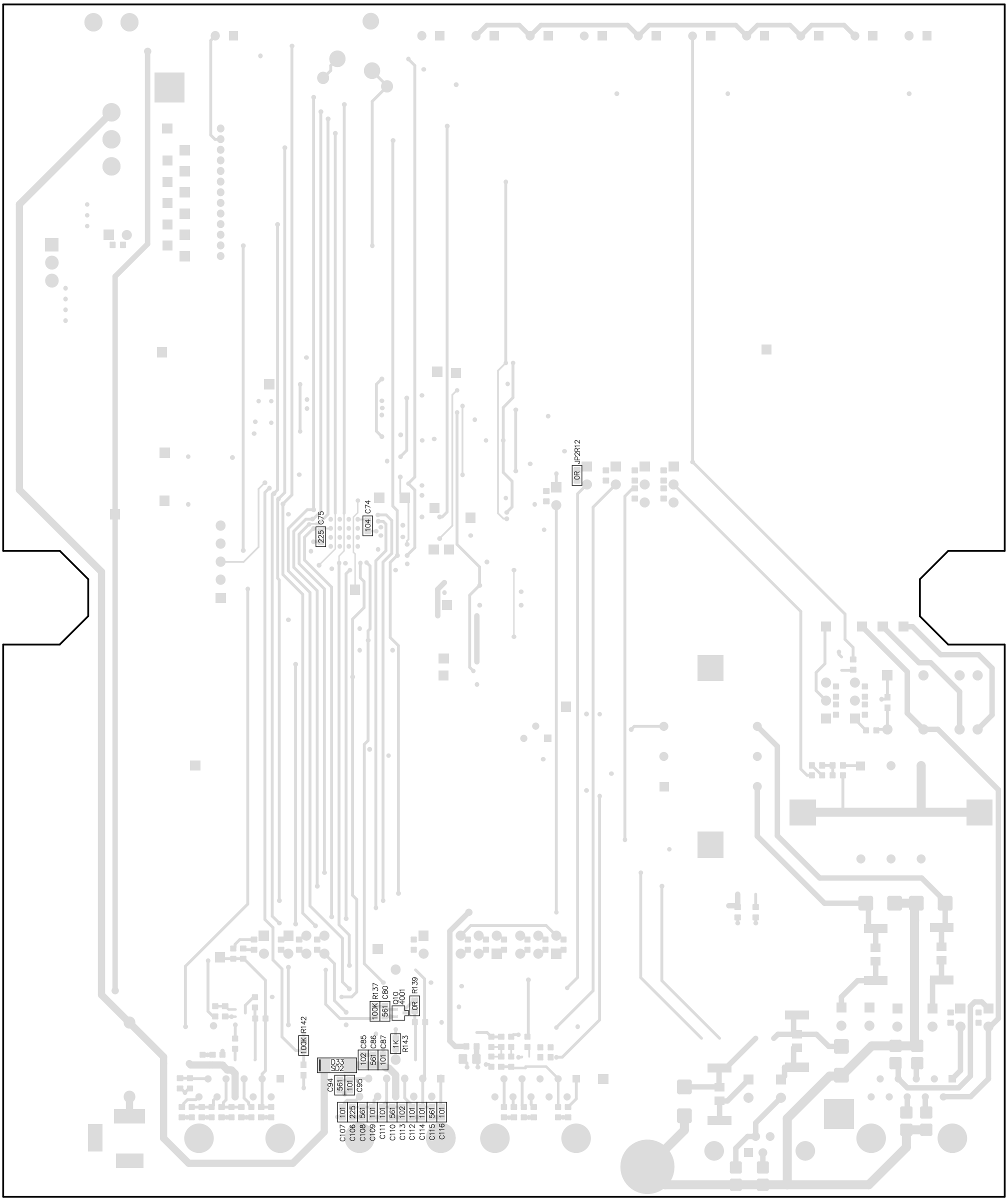

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