

# UD-1B-IC1

## MULTI-TONE, MULTI-FORMAT SELECTIVE CALL/DECODER WITH ANI AND TRANSPOND FOR ICOM MOBILES AND PORTABLES

### INSTRUCTION MANUAL

#### Programmable Signaling Formats

- DTMF Touch Tone®
- Pulse Tone: 1500 Hz & 2805 Hz (Decode, Transpond & ANI)
- Two Tone: Motorola, General Electric, & Reach (Decode, Transpond & ANI)
- Five Tone: EEA, CCIR, ZVEI, DZVEI, DZVEI, NATEL, EIA & MODAT (Decode, Transpond & ANI)
- CTCSS Encoder
- Burst Tone ANI
- Optional Ericsson/General Electric GE-Star ANI & Encode

#### Programmable Features

- Three programmable Selective Call Decoder Numbers for Individual, Group, & All Call, also European Group Call Using G Tone
- 0-8 Digit Leading and/or Trailing ANI
- 0-8 Digit Emergency ANI with Repeat
- Time Out Timer on PTT
- Busy Channel Lockout with Busy Tone
- Transpond
- Programmable Front Porch
- Remote Transmitter Turn On for Listening in on Conversations or Triangulation
- Deadbeat Disable/Stolen Radio Destruct

***The UD-1B ICOM is compatible with virtually all Two-Way Radio ANI Systems and now employs a quick disconnect plug and socket arrangement for simple installation and removal in ICOM IC-F3, IC-F4, IC-F30, IC-F40, F320, F420 and IC-F-1020 and 2020 mobiles.***

MODAT is a registered trademark of Motorola C & E. Touch Tone is a registered trademark of AT&T. GE-Star is a registered trademark of GE Ericsson.

**SPECIFICATIONS****VOLTAGE/CURRENT**

Operating Voltage ..... 5 VDC  
 Operating Current ..... 5.5 mA

**INPUTS**

Input Level..... 50 mVRMS  
 Input Impedance ..... 100K $\Omega$   
 Dynamic Range..... 25 dB  
 Frequency Range..... 280-2800 Hz  
 SINAD Ratio..... <8 dB  
 Band Width Five Tone ..... See Table 5  
 Band Width Pulse Tone .....  $\pm 4.5\%$   
 Band Width Motorola Two Tone .....  $\pm 1.3\%$   
 Band Width General Electric Two Tone.....  $\pm 1.6\%$   
 Band Width Reach .....  $\pm 1.7\%$

**OUTPUTS**

Ringing Output Tones ..... 3 (individual, group, all)  
 Momentary-Horn ..... 200 mA  
 Disable Output ..... 200 mA  
 PTT Output Current ..... 200 mA  
 Audio Output Level..... 1V RMS  
 CTCSS Output Codes..... 0-51  
 CTCSS Output Level..... 0 to -18 dB relative to ANI tones  
 Audio Output Impedance ..... 10K $\Omega$  - 22K $\Omega$   
 Burst Tone Freq. Range ..... 1.000-3000 Hz

**TIMING**

Tone/Burst Tone Timing..... 0.001-9.999 seconds  
 Key-Up Delay (Front Porch) ..... 00-99 seconds  
 Time Out Timer ..... 00-99 seconds  
 Number of Rings ..... 0-9  
 Queuing Signal Delay..... 0-9 seconds  
 Emergency ANI Repeat Delay..... 00-99 seconds  
 Emergency Input Debounce..... 0-9 seconds  
 Number of Emergency ANI Repeats..... 0-9  
 Emergency ANI Warning Timer ..... 0-9 Seconds  
 Minimum Encode Time Per Tone ..... 25 milliseconds  
 Minimum Decode Time Per Tone ..... 5 milliseconds

**ANI**

ANI ..... 0-8 digits  
 Emergency ANI ..... 0-8 digits

**DECODING SEQUENCE**

Three Phone Numbers..... 1-8 digits each

**MECHANICAL**

Dimensions..... 1.34" x .93" x .22"  
 Operating Temperature..... -30° to +60°C

**WARRANTY**

Midian Electronics, Inc., warrants this product to be free from defects in material and workmanship for two years from date of shipment. If such malfunction occurs, it will be repaired or replaced (at our option) without charge for materials or labor if returned to the factory. This warranty does not apply to any parts damaged due to improper use--including accident, neglect, unreasonable use, and improper installation--or to unauthorized alterations or modifications of the equipment. It does not extend to damage incurred by natural causes such as lightning, fire, floods, or other such catastrophes, nor to damage caused by environmental extremes, such as power surges and/or transients. It does not extend to microprocessors, if it is determined by Midian that the failure of a micro is due to static damage, application of improper voltages to the unit, or other problems not related to circuit design. In such case or in the case of a desire to update the micro to a different version of software, such request must be specified in writing, and there will be a charge agreed upon by both parties. This product is warranted to meet published specifications and to operate as specified only when properly installed in radio equipment which complies with U.S. FCC specifications and the applicable radio manufacturer's specifications. Midian Electronics is not responsible for any operational problems caused by system design, outside interference, or improper installation.

Equipment for repair can be returned to the factory without prior written authorization. A brief letter describing the nature of the defect should be included with the merchandise. Repair by other than Midian Electronics, Inc., will void this warranty. In-warranty merchandise must be shipped, freight prepaid, to Midian Electronics. Midian Electronics will return, freight prepaid via UPS ground, the repaired or replaced equipment to purchaser, within the United States. Out-of-warranty repairs will be billed at the rate of \$60 per hour, plus replacement parts.

This warranty applies to the original purchaser of the equipment only. Midian Electronics is not liable under this warranty, or any implied warranty, for loss of use or for other consequential loss or damage experienced by the purchaser. Some states do not permit the exclusion or limitation of implied warranties or consequential damages. This warranty provides special legal rights, and the purchaser may have other rights that vary from state to state.

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**SCHEMATIC**

**PICTORIAL**

**ICOM PROGRAMMER SCHEMATIC**

**ICOM PROGRAMMER PICTORIAL**

## INSTALLATION INSTRUCTIONS

Midian products utilize CMOS integrated circuits, which are susceptible to damage from high static charges. Be sure to follow standard antistatic procedures when handling, including using grounded workstations and soldering irons and wearing grounding bracelets.

Pin	Function	Instructions
30	Ground	Connect to ground in radio.
29	5 VDC	This Pin picks up 5 Volts from the radio's regulator.
6	COR/COS Busy	Detects when a channel is busy.
23	RX Tone Input	Connects to disc audio output.
25	Beep Out	This provides Ring, Time Out Timer, Penalty, and Go Ahead tones to the radio speaker.
24	RX Mute	Mutes receive audio until called.
26	AF ONOP	Turns on speaker driver during ring, busy, beep (with active "Hi").
Empty Hole	Disable Output	Used to disable a radio or vehicle through FET1. The output latches low until commanded to unlatch. This is activated by Ring Code 9 (See Table 1), Deadbeat Disable, and is saved to the EEPROM and is not lost on power down.
8	TX Tone Out	Connects to modulator signaling circuit. Per EIA specification, set ANI modulation pot R12 to 3.3 KHz of deviation.
27	Mic Mute	Kills mic audio to ground during ANI to prevent voice interference.
1	PTT In	<b>The UD-1B ICOM was originally designed to plug in to the Icom F3 &amp; F4 which uses positive going Push to Talk polarity. This radio outsells all other Icom products combined.</b> <b>In the Icom F-320/420 and the F-1020/2020 mobiles and the IC-F-30/F-40 portables a logic low is used for PTT. The UD-1B ICOM can be capable of logic low Push To Talk polarity. by switching the PTT Input transistor Q1 with PTT Output diode D6.</b> <b>Note: When ordering for Icom F3 &amp; F4 specify a model number of UD-1B ICOM F3/F4. When ordering for Icom F30/F40 specify a model number UD-1B ICOM F30/F40. For Icom 320/420/2020 specify a model number of UD-1B ICOM Mobile.</b>
2	PTT Out	If you are using the ICOM's TOT and not the UD-1B's, you can leave W1 Jumper installed on the ICOM. The W1 Jumper is on the output of Q17. If you want to use the UD-1B's TOT and Penalty Timer, it will be necessary to remove Jumper W1 and program the UD-1B appropriately. Micro now has control of PTT for Time Out Timer. With W1 installed, the UD-1B will keep the unit keyed on quick key clicks to complete the ANI.
5	Program Input	This pin is the serial programming input to the UD-1B ICOM. Enter the desired programming information into the KL-3 & ICOM programming interface, then download to the UD-1B ICOM via this pin.
Empty Hole	Auxiliary/ Emergency Input	When taken to Ground, this input can send an emergency ANI or disable the transpond, depending on the digit programmed in <b>R14A, Auxiliary Input</b> in the <b>Input Control</b> register. Connect to a customer-installed switch such as a hidden foot pedal or mercury tilt switch for emergency ANI.

The UD-1B ICOM is a sub-set of the UED-1B, and as a result there will be some features and registers that are not used in the UD-1B ICOM version.

## 1.0 OPERATION

### 1.1 Controls and Indicators

The UD-1B ICOM is controlled by the PTT input and power. The PTT transmits the ANI, answers a call when ringing, and keys the transmitter during a conversation.

There is a beep tone output which sounds a go-ahead beep after ANI. It also emits side tone when tones are generated, provides the ring output when the unit is called, and provides the timeout timer and busy tones.

### 1.2 Sending ANI

The ANI is sent when the PTT input is first grounded (leading ANI) and/or when it is released (trailing ANI). There is a front porch key-up delay-programmable from .00 to .99 seconds-which allows for a front porch delay time to open a repeater's CTCSS decoder before the ANI is sent. To compute the front porch delay time, EIA specs state that a CTCSS decoder should open in 250 msec at 100 Hz. The time increases as CTCSS frequencies decrease. Therefore, from the high frequencies to the low frequencies, the time could run 100 to 500 msec. In addition, transmitter synthesizer lock time can also be a consideration and may vary from a few milliseconds to 100 msec. Also, E & M lead on microwave systems that may be tied to the repeater can add 50 to 100 msec delay. Satellite voting systems can also introduce additional delays.

The UD-1B ICOM also has a ANI repeat window, programmable from 00 to 99 seconds. This prevents the ANI from being sent every time the PTT is pressed to prevent irritating and repetitive ANIs during short conversations. For example, if this is set to 10 seconds, the unit will not ANI if PTT is pressed again within 10 seconds. This time is reset each time PTT is released.

### 1.3 Emergency ANI

The auxiliary input can be used either to control the emergency ANI. An emergency ANI can be sent by a manual switch or by a mercury "man down" tilt switch.

**Note:** If **Emergency ANI** is activated in register **R14B**, the **Disconnect ANI** and **Transpond Disable** features in **R14B** are not available.

### 1.4 Answering a Call

When the unit is called, ring tones are sent to the speaker. The AFONOP output will go high. The optional horn transistor will go low during each ring cycle for the duration of the tone. We recommend programming 1 perhaps 2 rings, otherwise the horn if turned on will be quite irritating. **NOTE:** The horn can also be jumpered to serve as deadbeat disable (see schematic/pictorial).

To answer the call, press PTT and carry on the conversation. If the call is not answered within the programmed number of rings (from 0 to 9), the ringing will stop. **R14H, Call Lamp Controls Squelch** programs whether the unit should unsquelch when called or after PTT is pressed. (Program as a 1 for most applications).

To terminate a call, turn the radio off and on, or if a switch is available, connect the monitor input to the switch and program **R14F, Monitor or Inactivity Resets Unit** to 1. This remutes the radio and also resets the channel busy lockout (if **R13E, Busy Lockout Enable** is set to 1).

Units can be programmed to receive Individual Call, Group Call, and Fleet Call (All Call). Each decode number has a unique ring tone to alert the user to the type of incoming call. (For the European "G" tone group call using the first decode number, see 1.5 below) Normally, the first decode number is used for individual call. The second and third numbers can be used for group and all call, or an individual call without transpond. Selecting a different ring tone for each decode number permits the user to distinguish between individual, group, and all call. By changing the ring codes (see Table 1), the second and third numbers can be used for Remote Radio Turn-on ("Monitor Mode"), Deadbeat Disable, or remuting the radio, instead of group call or all call.

**Note:** This product will not decode the 7 second single frequency "all call" that is used in Motorola two-tone paging systems. However, we offer a special version (UED-1B with Plectron option) to decode Plectron's long A & B tones as well as Motorola's long B tones. We also have an RT-2 that employs keyboard programmable tone frequencies instead of cap codes and supports log B tones.

### 1.5 European G Tone

The UD-1B ICOM decoder supports European formats that use a G tone by powers of 10 (for example, 1234G or 123GR), along with the capability of a separate group call.

### 1.6 Transpond

The UD-1B ICOM can be programmed to Transpond with its own ANI number, tone, or other format after receiving an Individual Call (from the base or from another radio). This Transpond feature confirms to the calling party that the radio being called is ringing. Transpond is only permitted in the Individual Selective Call mode (Decode 1). It cannot be used in Group Call or All Call mode, as multiple transponds would collide and not get through. This also applies to European G tone.

The UD-1B ICOM is unique in its ability to receive a Selective Call in one format and then transpond in another format. For example, a unit can be called in either Touch Tone® or five-tone format, and it can then transpond in a two-tone format to call a pager. Transpond occurs immediately after decoding and before ringing begins.

### 1.7 Time-Out Timer (TOT)

In order to prevent one party from tying up a channel, or in the event of a stuck microphone, many systems require a time-out timer. This feature allows a radio transmitter to stay on the air for a programmed period of time. Then, it automatically shuts the transmitter off. After shutting off, the UD-1B ICOM generates a warning tone on the beep output Pin to alert the user that he has talked too long or his mic button is stuck.

### 1.8 Busy Channel Lockout

FCC regulations require radio users to open tone squelch and monitor a channel before transmitting. If they do not, they can interfere with radios already on the channel. **Busy Channel Lockout** automatically checks the channel, and (if the channel is busy) will not allow the transmitter to turn on or the receiver to unsquelch. This prevents a user from monitoring another person's call in selective call systems. If the channel is busy, the UD-1B ICOM generates a busy tone. The UD-1B ICOM can also be programmed to continue to check the channel (queuing signal delay) and provide the user with a tone to indicate that the channel is free.

### 1.9 Deadbeat Disable (Stolen Radio Destruct)

If a radio is lost or stolen (or if a customer is not paying his bills), this radio can be called and "turned off" to prevent further channel access or use of the radio. A special Disable Output is available which can enable a relay to disable the vehicle (see schematic). Ring code 9 activates this feature and blocks PTT through the micro, mutes the radio's squelch and generates a buzz to the radio's speaker through the "Alert Tone/Speaker Out" lead (see Table 1). Calling the lost/stolen unit re-enables the unit.

### 1.10 Remote Transmit Turn On

This feature can be used to turn on the transmitter of any unit in the system remotely when using Midian's CAD-100/200. This enables the base to monitor conversations or triangulate (by using direction finding equipment) to locate lost or stolen radios. This feature is activated by ring code 7; when activated, the radio (with the UD-1B ICOM installed) will remain keyed for 30 seconds. (See Table 1).

### 1.11 CTCSS Encode

The UD-1B ICOM can be programmed to open repeaters or base stations via one of 51 different CTCSS codes (38 standard codes plus 13 split codes). The UD-1B ICOM has a unique feature which allows the CTCSS to be delayed for a programmed period, which delays opening the repeater until after the unit's ANI is sent. Thus, the ANI is only received at a remote console connected to the repeater receiver, which prevents other system radios from having to listen to ANIs. This feature is normally not used because the ICOM already has CTCSS.

### 1.12 Multiple Tone Signaling Formats

The UD-1B ICOM is unique in its ability to decode, transpond, and ANI all of the most popular analog tone signaling formats in use around the world. Formats can be mixed for specific system needs. For example, you can decode in five-tone, transpond in two-tone sequential, and ANI in DTMF. Only Midian Signaling products offer this mix of programmable formats and features, allowing them to be tailored to virtually any system.

### 1.13. Burst Tone

Burst Tone format can be used for ANI. Enable this format by entering 05 for the ANI format; in this setting, the frequency desired is entered in Time 1, and the duration of the tone in Time 2.

### 1.14 Packaging Options

All of the UED/UD-1 features and formats are also available in a variety of products specially packaged for different system use. These include a mobile microphone and dash mount box (both with backlit keypad) and a miniature Bezel (heavy-duty plastic enclosure with keypad and electronics) for simplified mounting on the outside of portables. Specialized versions are also available for encode only (UE-1), decode only (UD-1), and ANI only (ANI-U) applications.

*All these Midian products are compatible with our CAD line of Base Commander Modems, which provide complete system information and control capability. Different models are available for DTMF formats, five-tone formats, and digital formats - in many different languages: English, French, German, Italian, Portuguese, and Russian.*

## 2.0 PROGRAMMABLE FEATURES

In the following section, each programmable feature is explained. Use the included programming worksheet to note the settings for your unit.

### 2.1 Decode Numbers 1, 2, and 3 - Register R01, R02, and R03

When the decoder receives a tone sequence, it compares it with the decode numbers located in registers R01, R02, and R03. Each register holds 1 to 8 digits followed by a ring code which controls the unit's response. The ring code must be one of the following:

- 0 - No ring tone - provides latched, momentary, call lamp outputs
- 1 - Standard telephone ring - provides latched, momentary, call lamp outputs
- 2 - Two tone ring - provides latched, momentary, call lamp outputs
- 3 - Pulsing tone - provides latched, momentary, call lamp outputs
- 7 - 30 second key up for monitoring stolen radios (always transponds)
- 8 - Turn off call lamp/remute
- 9 - Unit Deadbeat Disable (always transponds)

If a match is found the unit will do one of the following:

- a) Ring silently, passing any external ringing generated by telephone interconnect terminal (code 0).
- b) Begin ringing (codes 1, 2, or 3).
- c) Key transmitter for 30 seconds and transpond (code 7).
- d) Reset/remute the unit (code 8).
- e) Change deadbeat disable status and transpond (code 9). This disables the PTT, mutes the radio, latches the disable transistor, & generates a buzz in the radio's speaker via the "Alert Tone/Speaker Out" lead. This is saved to the EEPROM. It is a toggle action which can be set or reset each time the number is called. Turning off the radio will not defeat this action.

**Note:** If you do not want the unit to ring, set the ring tone following the decode numbers to 0, and the **Number of Rings** to 0 (see section 2.11, **System Parameters**).

### 2.2 ANI - Register R04

The ANI (Automatic Number Identifier) is sent when the PTT is pressed and/or when it is released, depending on how register **R12C, ANI Position** is programmed in **Transmit Parameters**.

### 2.3 Transpond - Register R05

If a transpond sequence has been programmed, it is sent back to the caller, and then the unit rings according to the programmed ring code. Although the UD-1B ICOM will transpond only on **Decode Number 1** (which is usually used for Individual Selective Calling), the unit will transpond on ring code 7 (30 second keyup or monitor mode) or ring code 9 (deadbeat disable) no matter which register the decode number is programmed into.

### 2.4 Preassigned Digits - Register R06

Not used – program to a 0.

### 2.5 Emergency ANI - Register R07

This field contains an Emergency ANI that is activated by a low on the Auxiliary/Emergency input lead, if register **R14B, Auxiliary Input** is set to 1. When **R14B** is set to anything besides 1, register **R07, Emergency ANI** becomes a Disconnect ANI, which is sent at the end of a conversation when the user presses # to disconnect from a call. A Disconnect ANI can also be sent automatically on loss of PTT if no repeater carrier is detected (out of range or time out); see register **R13J, COR/COS Timeout Delay** and register **R14K, Reset on Loss of Carrier** for details. The disconnect ANI also remutes the radio's squelch circuit via the "Monitor/Squelch Output" lead.

### 2.6 ANI Format/Tone Lengths - Register R08

**ANI Format/Tone Lengths** control the ANI format and timing for the first and subsequent tones.

- **R08A, ANI Format:** Choose this from the **ANI, Dial, Transpond, and Decode Modes Table (Table 4)**.
- **R08B, Time 1:** This setting controls the duration of tone 1. For five-tone formats, a separate first tone timing makes it possible to create a preamble tone. If nothing is entered in the first timing field, the unit will default to the industry standard timings for that format.
- **R08C, Time 2:** This setting controls the duration of tone 2. If a time is entered in **Time1** but nothing is entered in **Time2**, the unit will encode all tones for the timing entered in **Time1**. See tables 4-13.

If nothing is entered in **Time1** and **Time2**, the unit will default to industry standard timings. **This is the recommended setting.**

### 2.7 Dialing Format/Tone Lengths - Register R09

Not used – program to 0.

### 2.8 Decode Format/Tone Lengths - Register R10

**NOTE:** When using DTMF we recommend using a minimum of four digits in the decode address. When using 5/6 tone we recommend staying with at least 5 tones. This will prevent voice talk off problems when using short tones for high speed dialing.

Choose a decode format from the **ANI, Dial, Transpond, and Decode Modes Table (Table 4)** and enter it in **Decode Format**. Set the UD-1B ICOM to respond to the anticipated tone gap timing here. See tables 4 & 6. If the unit sees a tone gap greater than that which is programmed it will assume that the sequence is finished and begin decoding a new sequence. The five-tone decoder uses a sampling and averaging technique to improve the signal to noise ratio. Therefore, the decode tone timing should be set to approximately 1/5 to 1/6 the encode tone timings and should be set in increments of 5 ms. For example, if a sending unit's encoder timing is set to 33 ms, the decode time programmed in **Time1** should be set to 5 ms. If the encode timings are set to 100 ms, the decode **Time1** is then set to 20 ms. The UD-1B ICOM's decoder does not decode reliably in the five-tone format with encoded tone times of less than 20 ms. For minimum decode timing, we recommend using 5 ms decode timing with 30 ms encode tone timings. CCIR and ZVEI standards are 100 msec and 70 msec. To save time these products can be used down to 25 msec.

Recommended decode timings are:

5 msec	5-tone (30-70 msec)
10 msec	5-tone standards (70 & 100 msec)
10 msec	1500 & 2805 Hz dialing
200 msec	2-tone
1 sec	DTMF Manual Dialing
200 msec	DTMF Auto Dial

## 2.9 Transpond Format/Tone Lengths - Register R11

The transpond format and tone lengths are programmed in here in the same manner as the **ANI Format/Tone Lengths**. See section 2.6.

## 2.10 Transmit Parameters - Register R12

**Transmit Parameters** control the operation of the UD-1B ICOM during a call.

- **R12A, Time-Out-Timer:** This sets a period of 01 to 99 seconds, in one-second increments. Entering 00 disables this feature. At the end of the time out period, an alert tone will be sent to the radio speaker, and the transmitter will unkey. Also see **R14I (PTT Options)**.
- **R12B, Front Porch Key-Up Delay:** This allows the user to program a front porch key-up delay to open a repeater or a radio's CTCSS decoder. When sending ANI, the transmitter will key, pause for the programmed key-up delay time, and then send the tones. (See section 1.2., **Sending ANI**, for a description of how to compute the front porch key-up delay time.)
- **R12C, ANI Position:** This controls where and whether ANI is transmitted. You can choose no ANI (0), leading ANI (1), trailing ANI (2), or both (3). If ANI is set to **0**, and an ANI is programmed none will be sent. Setting this to 0 disables ANI transmission, which may be used for installations where only the Emergency Number Identification is used. When using generic 2-tone paging formats that do not have ANI already programmed, set register 12C to **1** for leading ANI. This tells the unit that you "own" the channel and can release the squelch on PTT unless busy is detected on the COR line and busy lockout is enabled. In "talk back" paging systems, you are never allowed to unkey the radio until you have received the call. Therefore, see registers R14H and R14J.
- **R12D, Special ANI Functions:** This controls additional features of ANI. This setting has 2 values besides 0, which is used for normal CTCSS operation. Entering a 1 will delay CTCSS during key-up and ANI. Entering a 3 will delay CTCSS during key-up and ANI, plus it will cause the unit to emit a beep to prompt the user to speak when the microphone is unmuted. The delayed CTCSS can be used to prevent a repeater from passing the ANI through.
- **R12E, Repeat Window:** ANI will not be sent again if PTT is pressed or released during the time period set here. This prevents irritating, repetitive ANIs during quick PTT responses.
- **R12F, CTCSS Code:** This register controls the CTCSS frequency that is generated whenever the transmitter is active. See Table 3 for the frequency codes.

- **R12G, CTCSS Level:** Enter the level from Table 2 to produce the proper CTCSS deviation relative to ANI tones.

## 2.11 System Parameters - Register R13

Miscellaneous system parameters are controlled here.

- **R13A, Forced Encode Length:** Not used – program to 0.
- **R13B, Number of Rings:** This controls the number of rings from 0 to 9. Each ring, including the silent ring, takes 5 seconds, including ring time and gap time (see Table 1). **Note:** During the ring or gap time, the decoder will not accept another sequence. If no ring is desired program the desired decode register to 0 instead of 1, 2, or 3.
- **R13C :** Not used - program to 0.
- **R13D, Queuing Signal Delay (COR on J5-6 on some radios):** If a queuing delay has been set here, the unit monitors the channel via the COR/COS input lead until it has been idle for the queuing period. Three beeps are generated to indicate when the channel is no longer busy and now available.
- **R13E, Busy Lockout Enable (available if COR is on J5-6 in radio):** This sets whether the unit will emit a busy tone when the operator attempts to ANI on a busy channel. Icom F3/F4 does not have Busy lead.

The next four settings control how the Emergency ANI feature functions.

- **R13F, Emergency ANI Debounce:** This controls how long the auxiliary emergency/transpond input must go low before the emergency ANI is sent. For example, if a mercury tilt switch is used, it can be set to 0 to 9 seconds to prevent accidental emergency ANI.
- **R13G, Emergency ANI Count:** This controls how many times the emergency ANI is sent. If set to 0, it will continue to send until the decoder receives a handshake back from the base unit; during this emergency ring period, any decoded number (decode number 1, 2, or 3) will clear the emergency condition. If set from 1 to 9, the unit will send the emergency ANI for that number of times and then stop. (In this case, the unit will not reset when it is called but wait until the programmed number of Emergency ANIs are sent.)
- **R13H, Emergency ANI Delay:** This programs the repeat delay between emergency ANIs.
- **R13I, Emergency ANI Warning Delay:** This provides for a warning tone before the Emergency ANI is transmitted. This can be used in systems where users forget to turn off their portable radios before setting them down, which would inadvertently send an emergency signal. **Example:** Emergency ANI Input Debounce is set to 9 seconds, while the Emergency ANI Warning Delay Timer is set to 5 seconds. Then, when the unit is set down, a warning tone will be emitted after five seconds (i.e., **before** the emergency

signal is sent), alerting the user that an emergency ANI will be sent in 4 more seconds, unless the radio is righted.

**Note:** There is an optional plated through hole on the UD-1B ICOM board so that an emergency input can be tied to a mercury tilt switch in portable radios if space is available, a momentary button on the portable or to a hidden foot switch in mobile radios. This provides a "man down" emergency ANI when the user is incapacitated or in danger of being robbed, etc.

- **R13J, COR/COS Timeout Delay (available if COR is on J5-6 in radio):** This operates in conjunction with **R14K, Reset On Loss of Carrier** (see sec. 2.12). The digit entered here corresponds to the number of seconds that the unit will wait before resquelching after loss of COR/COS if register **R14K, Reset On Loss of Carrier** is enabled.

## 2.12 Input Control - Register R14

This register programs the input and output circuits.

- **R14A, DTMF Hot Dialing:** Not used – program to 0.
- **R14B, Auxiliary Input:** This establishes how this input is implemented. To use this for an emergency input, set to 1. To use as a transpond controller, set to 2. **Note:** Setting this to anything besides 1 will enable the **Disconnect ANI** feature.
- **R14C, Squelch Polarity:** This controls the radio's squelched polarity and can accommodate any radio's logic. The Icom UD-1B has reversed polarity of Midian's UD-1 product line and should be set to a logic 0 to get an active high and to mute the radio.

**NOTE:** To program the unit to instantly unsquelch when called, program register **R14H (Call Lamp Controls Squelch)** to 1. If you do not want the unit to ring, program ring tone 0 following your decode number and register R13B (Number of Rings) to 0. If you do want the unit to ring, program the desired ring tone and number of rings as usual.

- **R14D, COR/COS Polarity:** Program the active state of the COR/COS input polarity. The Icom UD-1B has reversed polarity of Midian's standard UD-1 product line. Setting this to 1 assigns COR/COS polarity to ground, while setting it to 0 assigns it to a high.
- **R14E, Monitor Input Polarity:** Program the monitor input polarity here. If using a hook switch or mic hang-up button, enter 1 for a voltage going from a low to a high when the mic is taken off hook. If using a monitor switch, enter 0 for a voltage going from a high to a low to monitor.
- **R14F, Monitor or Inactivity Resets Unit:** This allows the user to select whether the unit resets on mic hang up. Set to 1 to enable reset on mic hang up. Set to 0 to disable reset on mic hang up. You can also cause a reset if the user is

inactive for a period of 25 seconds. When set to 2, the unit will reset 25 seconds after PTT was last pressed or immediately if the mic is put on-hook, whichever comes first.

- **R14G, Monitor Controls Squelch:** This programs whether the radio will unsquelch on monitor. If this is set to 0, then the unit will not be able to use the monitor feature.
- **R14H, Call Lamp Controls Squelch:** This sets whether the radio will unsquelch when called. If yes (1), the unit will unsquelch immediately, before ringing. If no (0), the unit will unsquelch when a call is answered (by pressing PTT), during or after ringing. Note that whether 0 or 1 is selected, pressing PTT will unsquelch the radio. If it is desired that the radio unsquelch only when it is called set this to 2. This feature allows the user to send ANI to dispatch to request to talk. The dispatcher then calls the user, opening his squelch so he can listen.
- **R14I, PTT Options:** This allows the UD-1B ICOM to be installed with or without breaking the PTT line.

To use **Busy Channel Lockout** and **Time Out Timer** features, enter a 0. Enter 1 if the PTT In and PTT Out are tied to the same point (i.e., the PTT line is not broken) This keeps the transmitter keyed during quick PTT clicks to complete the ANI if using ICOM TOT. Program R12A (Time-Out Timer) to **00**.

When set to 2, ANI PTT for call request is active, normal PTT is locked out until the unit is called. Pressing PTT will send leading ANI only and then de-key, thus preventing the user from talking on the channel. Once the unit is called, the user can talk on the channel. PTT will once again be locked out if the mic is placed on-hook (register **R14F** must be set to 1). If register **R14K** is not 0, then PTT will be locked out again after carrier drops for the time period specified in register **R13J**. Register **R14G** must be set to 0, and the PTT path in the radio must be broken in order for this feature to operate as described above.

- **R14J, Ring Tones Control Squelch:** This controls the squelch output line during beep tone generation (ring, busy, TOT, beep). This enables or disables the UD-1B ICOM's audio amp. Enter 0 to disable this feature. Enter 1 if the radio must momentarily squelch during ringing. Enter 2 if the radio must momentarily unsquelch during ringing.
- **R14K, Reset On Loss of Carrier:** This allows the UD-1B ICOM to automatically disconnect after loss of carrier. The squelch output lead can be opened by the monitor input, as usual, but the squelch will not be reasserted until the COR/COS input has dropped for 0-9 seconds (see **COR/COS Timeout Delay**). This permits operation on old repeaters that keep the carrier active but stop generating CTCSS during the COR/COS time. It

also allows talk-back paging systems to remute the portable between calls. Programming a 0 allows for no timeout. Programming a 1 will cause the unit to reset after waiting for the timeout delay programmed in **COR/COS Timeout Delay**. Programming a 2 will also cause the unit to reset after the timeout has elapsed, but only if the UD-1B ICOM doesn't "own" the channel (i.e. no previous ANI). To program the unit to simply monitor during off hook, set register **R14G, Monitor Controls Squelch** to 1 and register **R14F, Monitor or Inactivity Resets Unit** to 1.

### 2.13. Special Programming Options

If you want the UD-1B ICOM to unsquelch when called or on PTT set the following registers as indicated:

Register 12C to 1  
Register 13E to 0  
Register 14C to 0  
Register 14D to 1  
Register 14H to 1

If you do not want to remove the PTT jumper resistor on the Icom board and use the UD-1B ICOM's Time-Out Timer, then set register R12A (Time-Out Timer) to 0 and set register R14I (PTT Options) to 0.

It is also necessary to go into the Icom programming software and turn "OFF" two tone decoding.

## 3.0 PROGRAMMING

The UD-1B ICOM must be programmed by Midian's KL-3 software. This file is called TONEPROG and is located on the KL-3 disk labeled **KL/3 (TONEPROG & TVSx)**. For further information, consult the KL-3 Instruction Manual or the online help files.

To program the UD-1B ICOM complete the following steps:

1. Attach the KL-3 pin plug to the computer's serial port
2. Connect the battery to the Icom interface board being careful to insert observing proper polarity
3. Plug the UD-1B ICOM module into the Icom interface board
4. After attaching the KL-3 to the IBM PC, the unit can be programmed by selecting TONEPROG in the KL-3 software.
5. To program the unit's settings press and hold the push button on the Icom programming interface. **You must send programming information to the unit within 5 seconds of power up, which is accomplished by pressing the button on the Icom programming interface.** The power On light will turn on while the button is continuously pressed. The programming light will flash at the completion of programming at which time the button can be released.

6. Once the program parameters have been set, it is recommended that the settings be saved on your computer.

**NOTE: On the Icom Programming Interface there is a black PTT polarity jumper. When programming an Icom F3 or F4 which uses positive PTT polarity move the jumper over to P. When using Icom Mobiles and F30/40 portables which use ground PTT logic move the jumper over to M.**

4.0 PROGRAMMING TABLES

RING CODE	FUNCTION
0	NO RING TONES-LAPSED, MOMENTARY, CALL LAMP OUTPUT
1	STANDARD TEL. RING-LAPSED, MOMENTARY, CALL LAMP OUTPUT
2	TWO TONE RING-LAPSED, MOMENTARY, CALL LAMP OUTPUT
3	PULSING TONE RING-LAPSED, MOMENTARY, CALL LAMP OUTPUT
7	30 SECOND KEYUP FOR LOCATING STOLEN RADIO
8	RESET CALL LAMP & LATCHED OUTPUTS
9	UNIT DEADBEAT DISABLE

CODE	LEVEL (dB)	CODE	LEVEL (dB)
0	-18	5	-8
1	-16	6	-6
2	-14	7	-4
3	-12	8	-2
4	-10	9	-0

38 STANDARD CTCSS TONES								NON-STANDARD CTCSS SPLITS †	
BCD	HZ	BCD	HZ	BCD	HZ	BCD	HZ	BC D	HZ
00	0.0	10	94.8	20	131.8	30	186.2	39	69.4
01	67.0	11	97.4	21	136.5	31	192.8	40	97.4
02	71.9	12	100.0	22	141.3	32	203.5	41	159.8
03	74.4	13	103.5	23	146.2	33	210.7	42	165.5
04	77.0	14	107.2	24	151.4	34	218.1	43	171.3
05	79.7	15	110.9	25	156.7	35	225.7	44	177.3
06	82.5	16	114.8	26	162.2	36	233.6	45	183.5
07	85.4	17	118.8	27	167.9	37	241.8	46	189.9
08	88.5	18	123.0	28	173.8	38	250.3	47	196.6
09	91.5	19	127.3	29	179.9			48	199.5
								49	206.5
								50	229.1
								51	254.1

† - Note: Using non-standard split tones might result in falsing to standard adjacent tones.

#	MODE	TIME 1	TIME 2	#	MODE	TIME 1	TIME 2
00	NONE	UNUSED	UNUSED	33	MOTOROLA N	FIRST TONE	NEXT TONE
01	DTMF	TONE ON	TONE OFF	34	MOTOROLA P	FIRST TONE	NEXT TONE
02	2805	DIAL RATE	TAIL TONE	35	MOTOROLA Q	FIRST TONE	NEXT TONE
03	1500	DIAL RATE	TAIL TONE	36	MOTOROLA R	FIRST TONE	NEXT TONE
04	NONE	UNUSED	UNUSED	37	MOTOROLA S	FIRST TONE	NEXT TONE
05	BURST	FREQ	TIME	38	MOTOROLA T	FIRST TONE	NEXT TONE
20	MOT GENERAL	FIRST TONE	NEXT TONE	39	MOTOROLA U	FIRST TONE	NEXT TONE
21	MOTOROLA A†	FIRST TONE	NEXT TONE	40	MOTOROLA V	FIRST TONE	NEXT TONE
22	MOTOROLA B	FIRST TONE	NEXT TONE	41	MOTOROLA W	FIRST TONE	NEXT TONE
23	MOTOROLA C	FIRST TONE	NEXT TONE	45	GE	FIRST TONE	NEXT TONE
24	MOTOROLA D	FIRST TONE	NEXT TONE	46	REACH	FIRST TONE	NEXT TONE
25	MOTOROLA E	FIRST TONE	NEXT TONE	50	CCIR	FIRST TONE	NEXT TONES
26	MOTOROLA F	FIRST TONE	NEXT TONE	51	EEA	FIRST TONE	NEXT TONES
27	MOTOROLA G	FIRST TONE	NEXT TONE	52	EIA	FIRST TONE	NEXT TONES
28	MOTOROLA H	FIRST TONE	NEXT TONE	53	ZVEI	FIRST TONE	NEXT TONES
29	MOTOROLA J	FIRST TONE	NEXT TONE	54	DZVEI	FIRST TONE	NEXT TONES
30	MOTOROLA K	FIRST TONE	NEXT TONE	55	DDZVEI	FIRST TONE	NEXT TONES
31	MOTOROLA L	FIRST TONE	NEXT TONE	56	NATEL	FIRST TONE	NEXT TONES
32	MOTOROLA M	FIRST TONE	NEXT TONE	60	MODAT	FIRST TONE	NEXT TONES

† - Motorola A is not a Motorola standard.

Notes: When transponding, or ANIing with 2805 and 1500 Hz formats, the break tone/make tone ratio is 60/40 at 10 or 20 pps. Time 1 in the chart represents the tone break ratio in the dialing sequence. Therefore, with a 60/40 ratio, the tone break time will be 1.5 times the

tone on time. As a result, the tone off times should be 40 and 20 ms at 10 and 20 pps, respectively. Set Time 2 to be the tail time. Burst tone ANI frequency range: 1.000 to 3000 Hz; Time range: .001 to 9.999 seconds. The UD-1B ICOM does not decode Burst tone formats.

TABLE 5: SEQUENTIAL SINGLE FREQUENCY CODES & TIMINGS									
TONE NUMBER	CODE DIGIT	EUROPEAN FIVE/SIX TONE FREQUENCIES IN HZ						MOTOROLA	
		EEA	CCIR	ZVEI	DZVEI	DDZVEI	NATEL	EIA	MODAT
TONE 0	0	1981	1981	2400	2200	2400	1633	600	637.5
TONE 1	1	1124	1124	1060	970	1060	631	741	787.5
TONE 2	2	1197	1197	1160	1060	1160	697	882	937.5
TONE 3	3	1275	1275	1270	1160	1270	770	1023	1087.5
TONE 4	4	1358	1358	1400	1270	1400	852	1164	1237.5
TONE 5	5	1446	1446	1530	1400	1530	941	1305	1387.5
TONE 6	6	1540	1540	1670	1530	1670	1040	1446	1537.5
TONE 7	7	1640	1640	1830	1670	1830	1209	1587	1687.5
TONE 8	8	1747	1747	2000	1830	2000	1336	1728	1837.5
TONE 9	9	1860	1860	2200	2000	2200	1477	1869	1987.5
REPEAT TONE	R	2110	2110	2600	2400	970	1805	459	487.5
GROUP TONE	G	1055	2400	2800	885	885	1995	2010	---
ALARM TONE	A	2400							
TONE WIDTH (MS)		40±4	100±10	70±15	70±15	70±15	70	33±.5	40±5
SEQ LENGTH (MS)		200	500	350	350	350	350	165	280
MAX INTERTONE TIME (MS)		4	7.5	15	15	15		0	
MIN GAP BEFORE/BETWEEN SEQ (MS)		100	290	140	140	140		33	
ENCODER TOLERANCE		±1%	±8HZ	±1.5%	±1.5%	±1.5%	±1.5%	±.1%	
MUST DECODE BW		±1%	±1%	±1.5%	±1.5%	±1.5%		±16HZ	
MUST REJECT BW		±3%	±3%	±4.5%	±4.5%	±4.5%		NS	

TABLE 6: ONE, TWO & FOUR TONE TIMING SEQUENCE				
FORMAT	CALL SEQUENCE	1ST TONE	GAP	2ND TONE
MOTOROLA 1 + 1 QUICK CALL 2	INDIVIDUAL CALL TONE & VOICE	1 SEC	0	3 SEC
	GROUP CALL	0	0	8 SEC
	TONE ONLY	.4 SEC	0	.8 SEC
	TONE ONLY BATTERY SAVE	2.7 SEC	0	.8 SEC
REACH TWO TONE	REACH SLOW	2 SEC	25 MS	.7 SEC
	REACH FAST	150 MS	25 MS	150 MS
	REACH GROUP CALL TWO TONE	5 SEC	0	0
GENERAL ELECTRIC	GENERAL ELECTRIC TYPE 99	1 SEC	0	1.5 SEC
NEC	GROUP CALL			
A	6 SEC	1 SEC	.25 SEC	3 SEC
B	6 SEC	1 SEC	0	3 SEC
C	4 SEC	1 SEC	0	1 SEC
D	3 SEC	.4 SEC	0	.4 SEC
L	3 SEC	.5 SEC	0	.5 SEC
M	4 SEC	.4 SEC	0	.8 SEC

TABLE 7: MOTOROLA CODE PLAN																					
FIRST DIGIT	CODE TYPE																				
	A*	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W
1	11	11	11	11	11	11	11	11	11	11	11	23	23	23	24	24	25	34	34	35	46
2	22	22	22	22	22	13	13	13	14	14	15	22	22	22	22	22	22	43	43	53	64
3	33	33	12	12	12	33	33	33	41	41	51	33	33	33	42	42	52	33	33	33	56
4	44	12	44	15	21	44	31	31	44	44	16	44	32	32	44	44	26	44	44	36	44
5	55	13	14	55	16	31	55	16	55	16	55	32	55	26	55	26	55	55	36	55	55
6	66	21	21	21	66	14	15	66	15	66	66	24	25	66	25	66	66	35	66	66	66
7		31	41	51	61	41	51	61	45	61	61	42	52	62	45	62	62	45	63	63	45
8		23	24	25	26	34	35	36	54	46	56	34	35	36	54	46	56	54	46	56	54
9		32	42	52	62	43	53	63	51	64	65	43	53	63	52	64	65	53	64	65	65

\* A is not a Motorola Standard.

TABLE 8: MOTOROLA GENERAL ENCODING PLAN		
FIRST DIGIT OF PAGER CODE	TONE A GROUP	TONE B GROUP
1	1	1
2	2	2
3	1	2
4	4	4
5	5	5
6	2	1
7	4	5
8	5	4
9	2	4
0	4	2

TABLE 9: MOTOROLA REED GROUPS												
TONE NUMBER	REED GROUP 1		REED GROUP 2		REED GROUP 3		REED GROUP 4		REED GROUP 5		REED GROUP 6	
	REED CODE	FREQ HZ	REED CODE	FREQ HZ	REED CODE	FREQ HZ	REED CODE	FREQ HZ	REED CODE	FREQ HZ	REED CODE	FREQ HZ
1	111	349.0	121	600.9	138	288.5	141	339.6	151	584.8	191	1153.4
2	112	368.5	122	634.5	108	296.5	142	358.6	152	617.4	192	1185.2
3	113	389.0	123	669.9	139	304.7	143	378.6	153	651.9	193	1217.8
4	114	410.8	124	707.3	109	313.0	144	399.8	154	688.3	194	1251.4
5	115	433.7	125	746.8	160	953.7	145	422.1	155	726.8	195	1285.8
6	116	457.9	126	788.5	130	979.9	146	445.7	156	767.4	196	1321.2
7	117	483.5	127	832.5	161	1006.9	147	470.5	157	810.2	197	1357.6
8	118	510.5	128	879.0	131	1034.7	148	496.8	158	855.5	198	1395.0
9	119	539.0	129	928.1	162	1063.2	149	524.6	159	903.2	199	1433.4
0	110	330.5	120	569.1	189	1092.4	140	321.7	150	553.9	190	1122.5

TABLE 10: GE TYPE 99 TABLE I			
GROUP	A	B	C
TONE #	FREQ	FREQ	FREQ
1	592.5	607.5	712.5
2	757.5	787.5	772.5
3	802.5	832.5	817.5
4	847.5	877.5	862.5
5	892.5	922.5	907.5
6	937.5	967.5	952.5
7	547.5	517.5	532.5
8	727.5	562.5	577.5
9	637.5	697.5	622.5
0	682.5	652.5	667.5
DIA		742.5 HZ	

TABLE 11: GE Type 99 Table II		
100'S	TONE REED GROUPS FOR	
DIGIT	1ST TONE	2ND TONE
0	A	A
1	B	A
2	B	B
3	A	B
4	C	C
5	C	A
6	C	B
7	A	C
8	B	C




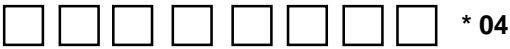
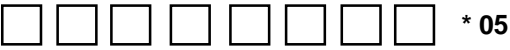
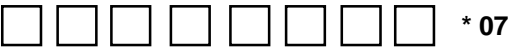
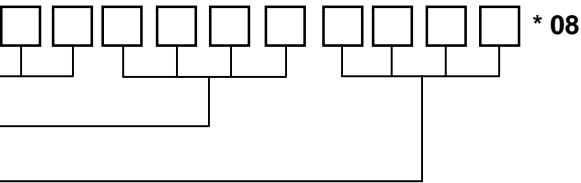
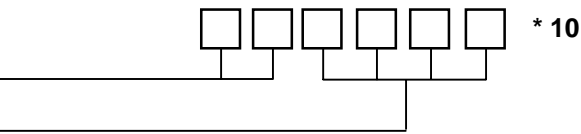
TABLE 12: REACH TWO-TONE SEQUENTIAL -- FAST OR SLOW		
1ST DIGIT OF CODE	GROUP FOR 1ST TONE	GROUP FOR 2ND TONE
1	A	C
2	C	A
3	B	D
4	D	B
5	A	D
6	D	A
7	A	E
8	E	A
9	B	E
0	E	B

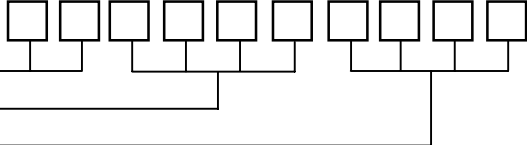
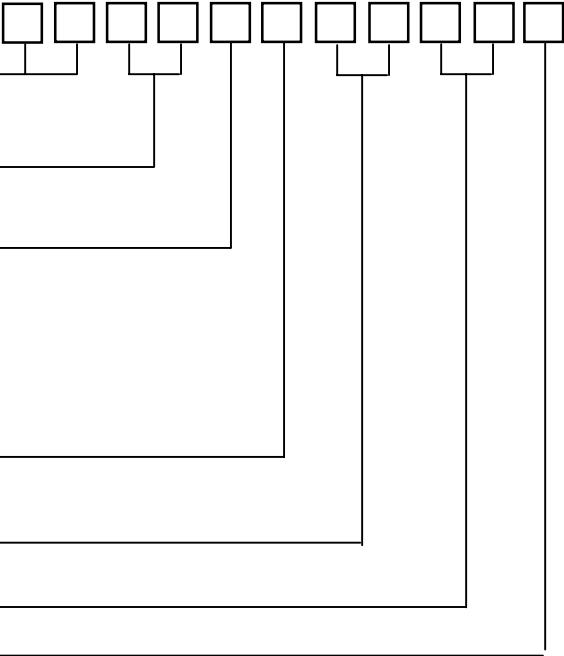
TABLE 13: REACH TWO-TONE & SINGLE TONE PAGING FREQUENCIES										
TONE NUM	GROUP A		GROUP B		GROUP C		GROUP D		GROUP E	
	CHN	FREQ	CHN	FREQ	CHN	FREQ	CHN	FREQ	CHN	FREQ
1	11	2704	21	1912	26	1608	36	1137	46	804
2	12	2612	22	1847	67	1553	37	1098	47	776
3	13	2523	23	1784	68	1500	38	1061	48	750
4	14	2437	24	1723	69	1449	39	1025	49	725
	15	2354	25	1664	30	1400	40	990	50	700
6	16	2274	26	1608	31	1352	41	956	51	676
7	17	2196	27	1553	32	1306	42	923	52	653
8	18	2121	28	1500	33	1261	43	892	53	631
9	19	2049	29	1449	34	1219	44	862	54	609
0	20	1980	30	1400	35	1177	45	832	55	588

\* For codes starting with an even first digit, (reverse 2<sup>nd</sup> and 3<sup>rd</sup> digits to find the proper frequencies and channels in **Table 13 Reach Two Tone & Single Tone Paging Frequencies** (e.g., 403 = 430). **Example:** 403 = Tone Channel 38 (Freq. 1061) and Channel 30 (Freq. 1400) respectively. Program a **403** in the unit's decode numbers 1, 2, or 3 to produce **430**.

### 5.0 UD-1B ICOM PROGRAMMING WORKSHEET

(To be used in conjunction with Midian's KL-3 Programmer)

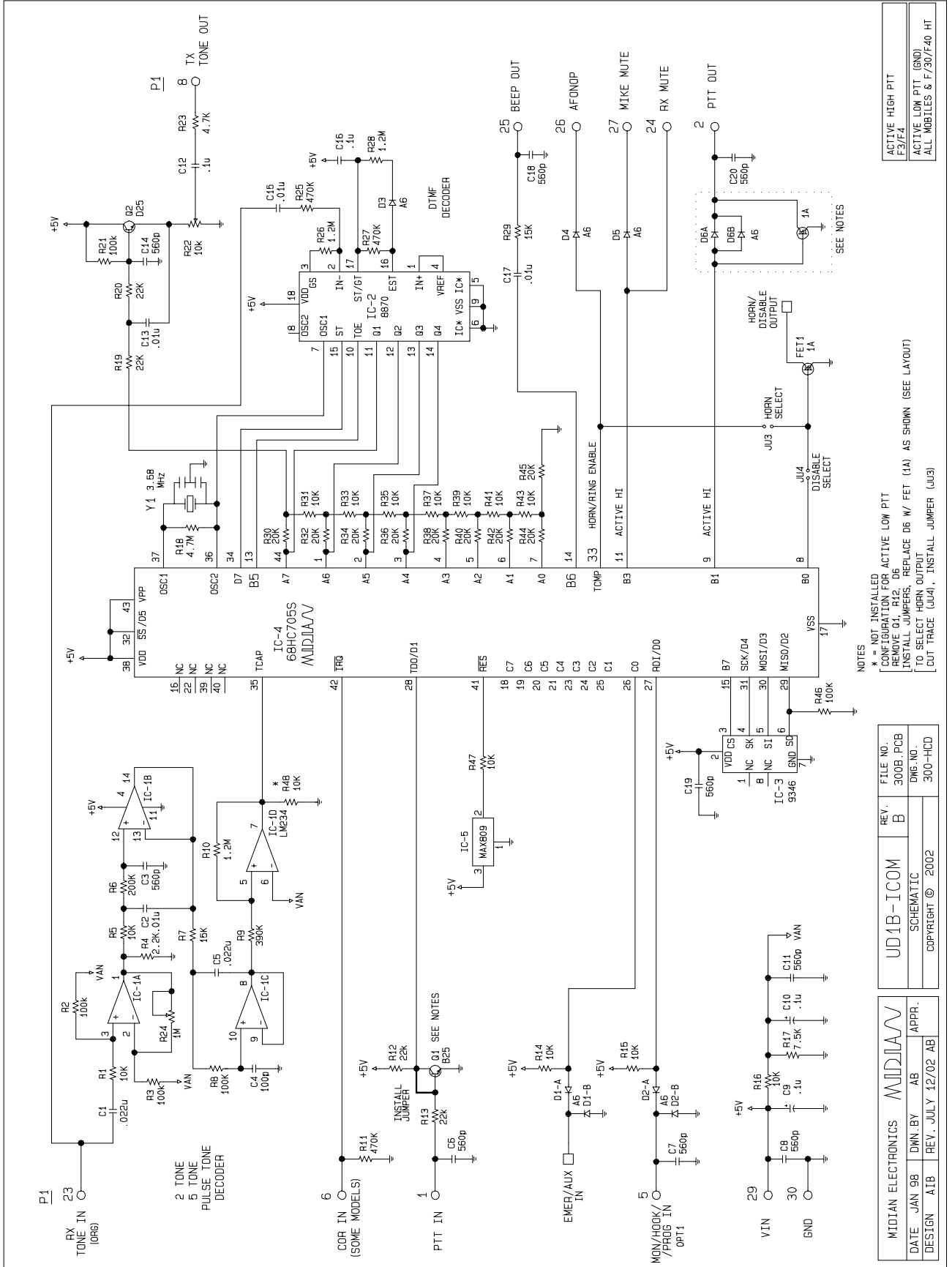
For this feature	Enter These Codes
<p><b>R 01: Decode Number 1 (0-8 digits) plus Ring Code (1 digit)</b>                      Enter the decode number plus Ring Code. The last digit entered will become the ring code. For example, if the decode number is 12345 with ring code 1, enter the sequence 123451 followed by * 01 (123451*01).</p>	
<p><b>R 02: Decode Number 2 (0-8 digits) plus Ring Code (1 digit)</b>                      Program in the same manner as Decode Number 1.</p>	
<p><b>R 03: Decode Number 3 (0-8 digits) plus Ring Code (1 digit)</b>                      Program in the same manner as Decode Number 1.</p>	
<p><b>R 04: ANI (0-8 digits)</b>                      Enter the ANI sequence of 1 to 8 digits. This will be transmitted when PTT is pressed and/or released, depending on the ANI Position setting in Transmit Parameters.</p>	
<p><b>R 05: Transpond (0-8 digits)</b>                      Enter the Transpond sequence of 1 to 8 digits. This sequence will be transponded only on decode of Decode Number 1; this prevents "mid-air collisions" on group call. (R14B determines if the unit will transpond in another format).</p>	
<p><b>R 06: Preassigned Digits - Not used in this product</b>                      Program to 0.</p>	<p style="text-align: right;">* 06</p>
<p><b>R 07: Emergency/Disconnect ANI (0-8 digits)</b>                      Enter the sequence that will be used as either a Disconnect ANI for interconnect use or as an Emergency ANI. For Disconnect ANI, program the Auxiliary Input in Transmit Parameters to anything except 1. For Emergency ANI, program the Auxiliary Input to 1. When the auxiliary input is taken low, this ANI will be sent after the Emergency ANI Input Debounce Time has expired.</p>	
<p><b>R 08: ANI Format &amp; Tone Lengths (10 digits)</b></p> <p>A) ANI Format (00-60; see table 4)                      Enter the two digits that corresponds to the format from Table 4.</p> <p>B) Time 1 (0.000-9.999 seconds)                      Enter the time for the first tone. This separate timing makes possible a preamble tone. If nothing is entered, industry standard timings will be used.</p> <p>C) Time 2 (0.000-9.999 seconds)                      Enter the time for subsequent tones. If nothing is entered here, all tones will be encoded for the length that is entered in Time 1.</p>	
<p><b>R 09: Dialing Format &amp; Tone Lengths – Not used in this product</b>                      Program to 0.</p>	<p style="text-align: right;">* 09</p>
<p><b>R 10: Decode Format &amp; Tone Lengths (6 digits)</b></p> <p>A) Decode Format (00-60; see table 4)                      Program in the same manner as ANI Format &amp; Tone Lengths.</p> <p>B) Time 1 (0.000-9.999 seconds)                      Note: When using 5-tone, enter a time that is approximately 1/5 or 1/6 of the encode tone time using increments of 5 ms. For example, if the encode tone timing is 25 ms per tone, set decode timing to 5 ms per tone. When decoding DTMF, we recommend twice gap time + tone time minimum. This will allow decoding of manually dialed tones as well as fast tones.</p>	

For this feature	Enter These Codes
<p><b>R 11: Transpond Format/ Secondary Dialing Format &amp; Tone Lengths (10 digits)</b></p> <p>A) Transpond Format (00-60; see table 4) Program in the same manner as <b>ANI Format &amp; Tone Lengths</b>.</p> <p>B) Time 1 (0.000-9.999 seconds) Program in the same manner as <b>ANI Format &amp; Tone Lengths</b>.</p> <p>C) Time 2 (0.000-9.999 seconds) Program in the same manner as <b>ANI Format &amp; Tone Lengths</b>.</p>	<p style="text-align: center;"><b>Enter These Codes</b></p>  <p style="text-align: right;">* 11</p>
<p><b>R 12: Transmit Parameters (11 digits)</b></p> <p>A) Time-Out-Timer (00-99) Enter a time out period here. Entering 00 disables this feature. Entering 01 to 99 sets the time out period from 1 to 99 seconds. At the end of this period, an alert tone will be sent to the speaker, &amp; the transmitter will unkey. Also see R14I (PTT Options).</p> <p>B) Key-Up Delay (.00-.99 seconds) Enter a front porch key-up delay of .00 to .99 seconds. When ANling, the transmitter will key, pause for the lead-in key-up delay, &amp; then send the tones.</p> <p>C) ANI Position (0=None, 1=Leading, 2=Trailing, 3=Both) Enter a number to indicate the ANI position: at beginning or end of PTT or both. If ANI is set to <u>0</u>, and an ANI is programmed none will be sent. When using generic 2-tone paging formats that do not have ANI already programmed, set register 12C to <u>1</u> for leading ANI. This tells the unit that you "own" the channel and can release the squelch on PTT unless busy is detected on the COR line and busy lockout is enabled. In talk back paging systems, you are never allowed to unkey the radio until you have received the call. Therefore, see registers R14H and R14J.</p> <p>D) Special ANI Functions (0=Normal, 1=Delay CTCSS, 3=Beep after ANI) Enter <u>1</u> to delay CTCSS during key-up &amp; ANI. Enter <u>3</u> to delay CTCSS during key-up &amp; ANI then emit a beep to prompt the user to speak when the mic is unmuted. Program <u>0</u> for normal ANI.</p> <p>E) Repeat Window (00-99 seconds) Program the time corresponding to the repeat window. If PTT is pressed or released within the repeat window, ANI will not be transmitted again.</p> <p>F) CTCSS Tone Programming (Normally not used – already in Icom) Enter the 2 digits corresponding to the CTCSS code from Table 3.</p> <p>G) CTCSS Attenuation Code (0-9, See table 2) Enter the 1 digit corresponding to the CTCSS modulation level from Table 2.</p>	 <p style="text-align: right;">* 12</p>

R 13: System Parameters (11 digits)		0	0	0	0	0	0	0	0	0	0	* 13
A)	Forced Encode Length Program to 0. (Not Used in UD-1 series)											
B)	Number of Rings Enter the number of times for the unit to ring upon decode. (0-9)											
C)	Horn Time/Speaker Beep Program to 0. (Not used in Icom)											
D)	Queuing Signal Delay The unit will monitor the channel until it has been idle for the time entered here and then generate 3 beeps to indicate that the channel is no longer busy. (0-9 seconds)											
E)	Busy Lockout Enable If Busy Lockout Enable is set to 1, then when the user attempts to ANI on a busy channel, the unit will emit a busy tone. (0=Disabled, 1=Enabled)											
F)	Emergency ANI Debounce Program the time from 0 to 9 seconds that the emergency input must remain low before the emergency ANI is sent. (0-9 seconds)											
G)	Emergency ANI Count Program the number of times that the Emergency ANI will be sent. If 0 is programmed, the unit will continue to send Emergency ANI until it is acknowledged by the system operator calling the unit. (0=Repeat until Reset, 1-9=# of Transmissions)											
H)	Emergency ANI Delay Program the time for the repeat delay between Emergency ANIs. (00-99 seconds)											
I)	Emergency ANI Warning Delay Program the time for a warning tone to be sent before the Emergency ANI is sent. For example, if <b>Emergency ANI Debounce</b> is set to 9, the delay timer can be set for 5 seconds. If a mercury tilt switch is used & the radio is accidentally placed on its side, a warning tone will be emitted at 5 seconds, indicating that in 4 more seconds, the Emergency ANI will be sent. (0=None, 1-9=seconds)											
J)	COR/COS Timeout Delay Enter the time that the unit will wait before resquelching after loss of COR/COS when <b>Reset on Loss of Carrier</b> is set to 1 or 2. See R14K. (0-9 seconds)											

For this feature	Enter These Codes											
<p><b>R 14: Input Control (11 digits)</b></p> <p>A) DTMF Hot Dialing (Not used in UD-1 series) Program to 0.</p> <p>B) Auxiliary Input (0=None, 1=Emer, 2=Xpond Disable) Program the Auxiliary Input for the function. Enter <u>0</u> if not used. Enter <u>1</u> if used for Emergency ANI. Enter <u>2</u> to disable transpond. Programming anything <u>except 1</u> will enable the Disconnect ANI.</p> <p>C) Squelch Polarity (0=V+, 1=GND) Enter the digit corresponding to the polarity required to squelch radio. This polarity is opposite of most of Midian's UD/UED product line.</p> <p>D) COR/COS Polarity (0=V+, 1=GND+) Enter the digit corresponding to the radio's COR/COS polarity in the <u>active</u> state. This polarity is opposite of most of Midian's UD/UED product line.</p> <p>E) Monitor Input Polarity (0=GND, 1=V+) If using a mic hook switch or mic hang-up button, enter <u>1</u> for a voltage going from a low to a high in the monitor mode. If using a monitor switch, enter <u>0</u> for a voltage going from a high to a low or <u>1</u> for voltage going from a low to a high in the monitor mode.</p> <p>F) Monitor or Inactivity Resets Unit (0=No, 1=Yes, 2=Reset Automatically) Program <u>1</u> if the unit will resquelch on mic hang up. When set to <u>2</u>, reset will happen automatically after 25 seconds of inactivity or immediately when the mic is hung up.</p> <p>G) Monitor Controls Squelch (0=No, 1=Yes) Program <u>1</u> if the radio will unsquelch on monitor.</p> <p>H) Call Lamp Controls Squelch (0=No, 1=Yes, 2=Unsquelch when called) Enter <u>0</u> if unsquelch after PTT answer. Enter <u>1</u> if the radio will unsquelch immediately when it is called. Enter <u>2</u> to unsquelch <u>only</u> when called.</p> <p>I) PTT Options (0=No, 1=Yes, 2=Lockout PTT) Enter <u>0</u> to use Busy Channel Lockout &amp; Time-Out Timer features. Enter <u>1</u> if PTT In &amp; PTT Out are tied to the same point. This keeps the TX keyed on quick PTT clicks to complete ANI. Program R12A (Time Out Timer) to <u>00</u>. Enter <u>2</u> to lockout PTT (but not ANI) until unit is called.</p> <p>J) Ring Tones Control Squelch (0=No, 1=Squelch, 2=Unsquelch) Enter <u>1</u> if the radio must momentarily squelch during ringing. Enter <u>2</u> if the radio must momentarily unsquelch during ringing.</p> <p>K) Reset on Loss of Carrier (0=No, 1=Yes, 2=Yes, Unless ANI was sent) Enter <u>1</u> if the unit will reset after loss of COR/COS, after waiting for the COR/COS timeout delay programmed in R13J. Enter <u>2</u> if the unit will reset after loss of COR/COS <u>unless</u> the unit sent its ANI. Enter <u>0</u> for normal operation.</p>	<div style="text-align: right; margin-bottom: 5px;">* 14</div> <table border="1" style="width: 100%; height: 40px; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">0</td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> </tr> </table>	0										
0												

**PRESS \* 0 0 TO EXIT PROGRAMMING MODE.**

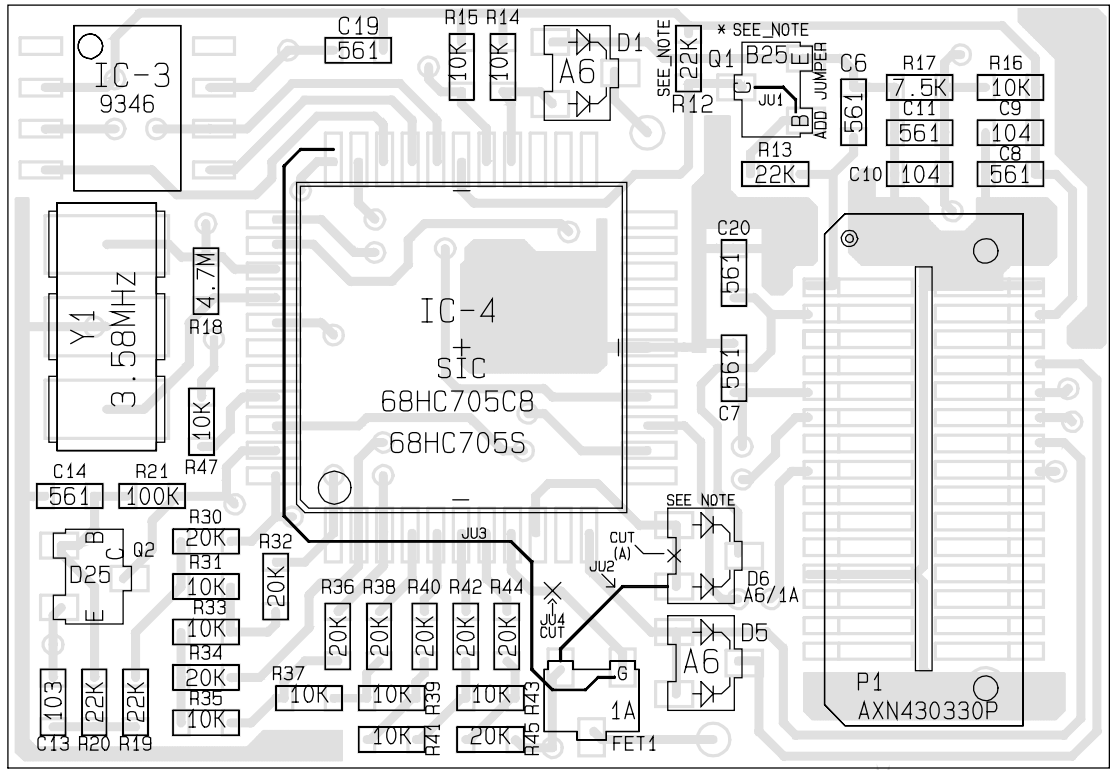


ACTIVE HIGH PTT  
E3/F4  
ACTIVE LOW PTT (GND)  
ALL MOBILES & P/30/F40 HT

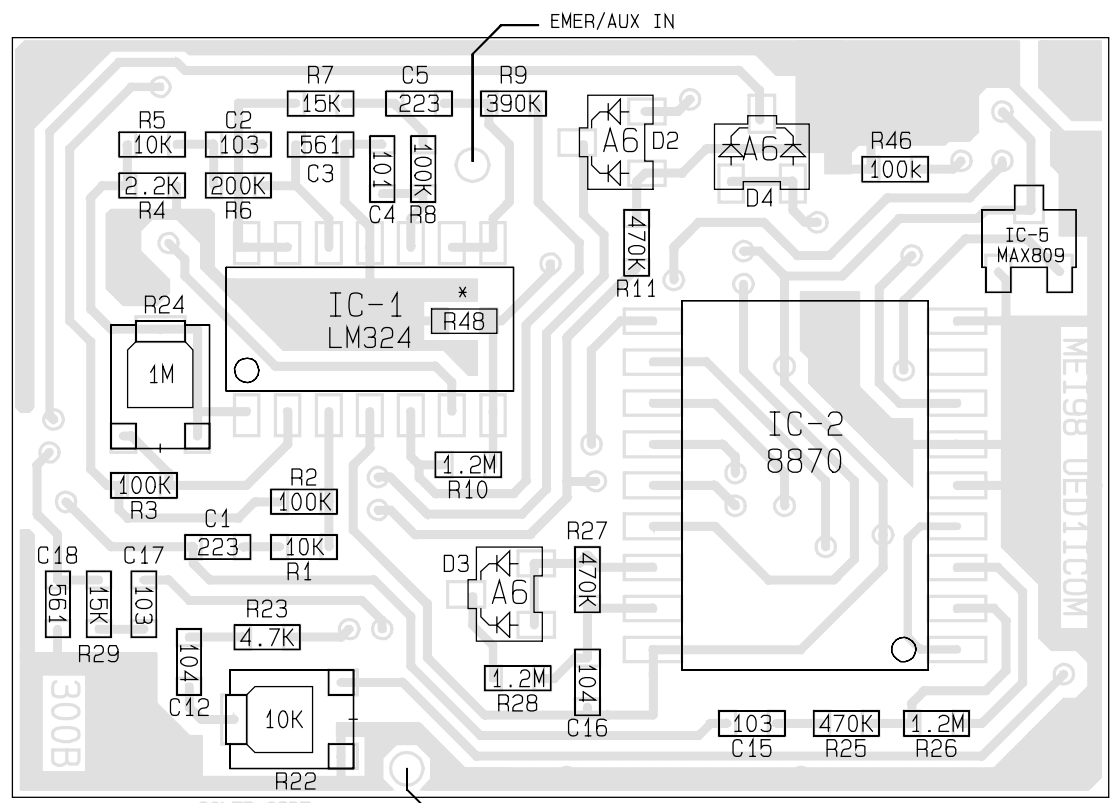
NOTES  
\* = NOT INSTALLED  
[CONFIGURATION FOR ACTIVE LOW PTT  
REMOVE Q1, R12, D6  
[INSTALL JUMPERS, REPLACE D6 W/ FET (1A) AS SHOWN (SEE LAYOUT)  
TO SELECT HORN OUTPUT  
CUT TRACE (JU4), INSTALL JUMPER (JU3)

FILE NO.	UD1B-ICOM
REV.	B
300B.PCB	
DWG NO.	SCHEMATIC
300-HCD	
REV.	0202
DATE	JAN 98
DESIGN	AIB
DWN.BY	AB
APPR.	
REV.	JULY 12/02 AB

MIDIAN ELECTRONICS	MIDIAN
DATE	JAN 98
DESIGN	AIB
DWN.BY	AB
APPR.	
REV.	JULY 12/02 AB

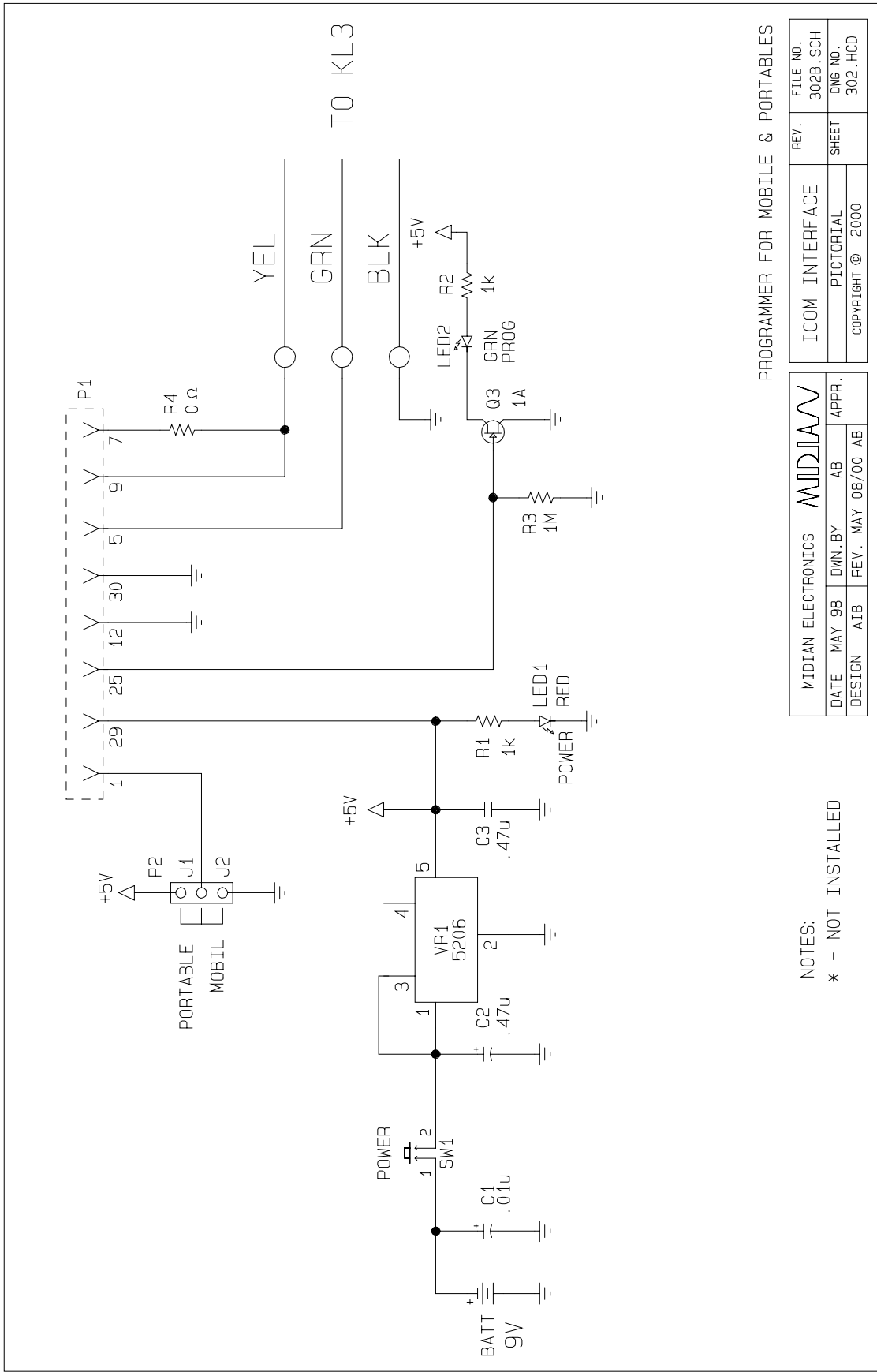


NOTE 1 - TO SELECT HORN OUT, CUT TRACE JU4, INSTALL JU3 \* = NOT INSTALLED  
 NOTE 2 - MOD FOR ACTIVE LOW PTT: REMOVE Q1, R12, D6 - INSTALL JU1 & JU2, CUT TRACE (A), REPLACE D6 W/FET (1A)



\* = NOT INSTALLED

MIDIAN ELECTRONICS		MIDIAN		UD1B-ICOM	REV. B	FILE NO. 300.PCB
DATE JAN 98	DWN.BY AB	APPR.		ALL MOBILES & F30/F40 HT		DWG.NO.
DESIGN AIB	REV. JULY 12/02 AB			COPYRIGHT © 2002		300-CHP

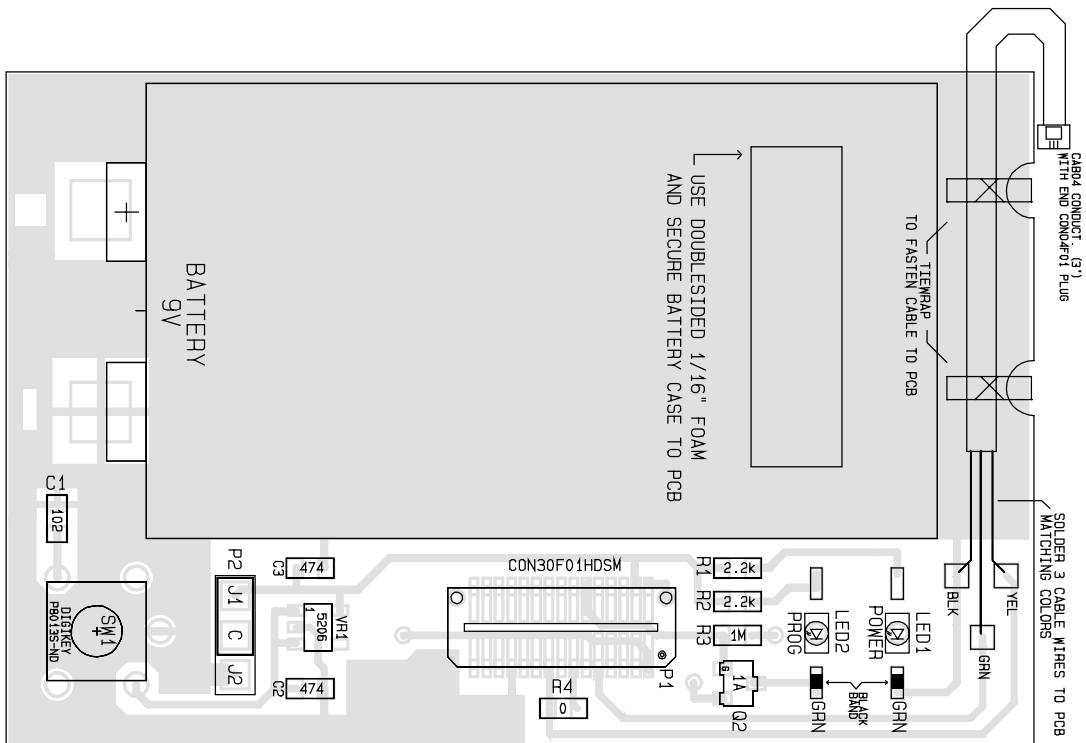


PROGRAMMER FOR MOBILE & PORTABLES

ICOM INTERFACE	REV.	FILE NO.
PICTORIAL	SHEET	302B.SCH
COPYRIGHT © 2000		DWG. NO.
		302.HCD

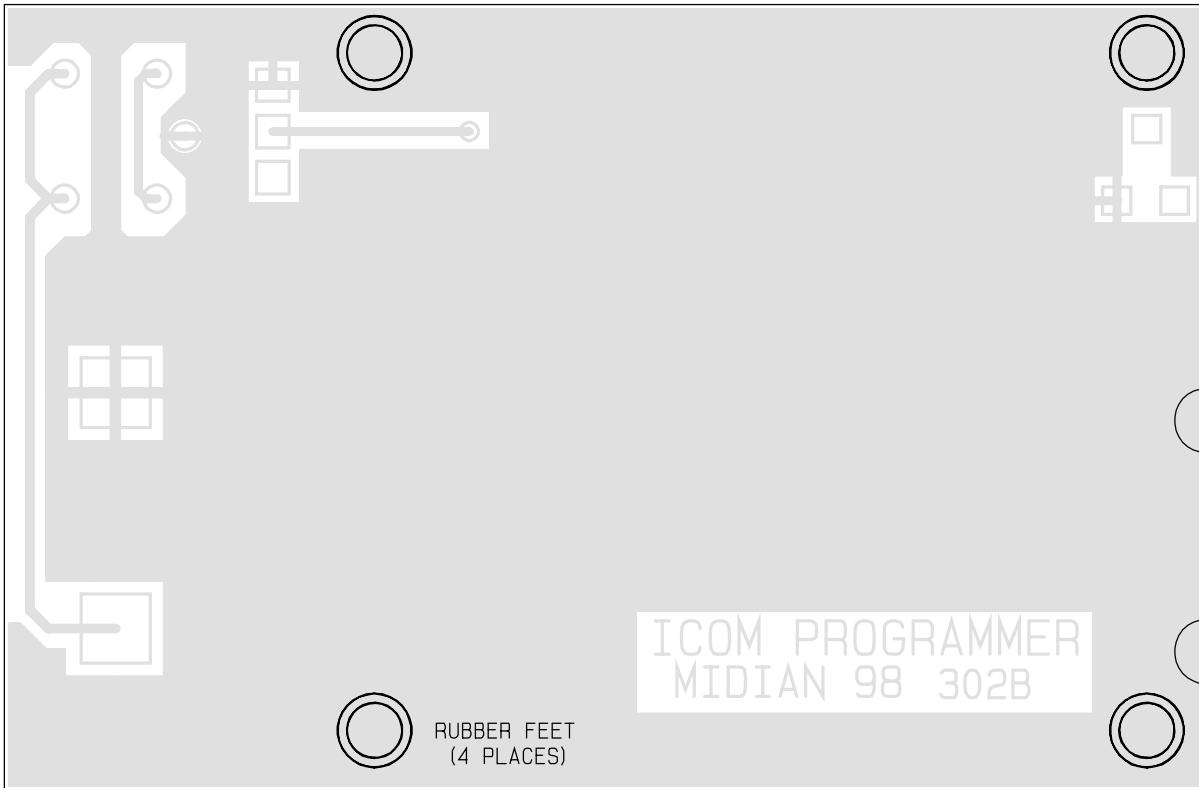
MIDIAN ELECTRONICS	MIDIAN
DATE MAY 98	DMN.BY AB
DESIGN AIB	REV. MAY 08/00 AB
	APPR.

NOTES:  
\* - NOT INSTALLED



NOTE: \* NOT INSTALLED P2 - 3 PIN HEADER W/ JUMPER PLUG (CON01MTMLBA)

CUT LED LEADS TO FIT SOLDERING PADS  
LEDS ARE FACING UP



MIDIAN ELECTRONICS		<b>MIDIAN</b>	
DATE	MAY 98	DWN.BY	AIB
DESIGN	AB	REV.	MAY 08/00 AB
		APPR.	

ICOM INTERFACE	REV.	FILE NO.
PICTORIAL		302B.PCB
COPYRIGHT © 2002	SHEET:	DWG. NO.
		302.CHP