ADD Series

ANI Display Decoder

Manual Revision: 2010-06-24

Covers Firmware Revisions:
ADD-100: 1.58 & Higher
ADD-200: 1.58 & Higher
ADD-400: 1.58 & Higher
ADD-500: 1.58 & Higher
ADD-600: 1.58 & Higher
ADD-MF: 1.58 & Higher

Covers Hardware Revisions:
ADD: 356B

HARDWARE SPECIFICATIONS

Operating Voltage	13.5-18 VDC
Operating Current	60 to 180 mA
Maximum Current	300 mA
Operating Temperature	-30 - +60 C
Audio Input Level (DTMF, MDC-1200, G-Star)	30 mV to 4.5 V p-p
Audio Input Level (5-Tone)	400 mV to 4.5 V p-p
Audio Input Level (FleetSync)	30 mV to 4.0 V p-p

SIGNALING SPECIFICATIONS

ADD-100: DTMF	
ANI Length	Up to 6-digits
ANI Timing	60/40 msec
ADD-200: 5-tone	
ANI Length	Up to 6-digits
ANI Timing	Varies on Format
ADD-400: Harris' G-Star (aka GE-Star)	
ANI Range	0001-9,999
ANI Timing	320 msec
ADD-500: Motorola's MDC-1200	
ANI Range	0000-FFFF
ANI Timing	~180 msec
ADD-600: Kenwood's FleetSync	
Unit ID Range	1000-4999
Unit ID Timing	~100-150 msec
ADD-MF:	
All Protocols listed above except Kryptic	

INSTALLATION OVERVIEW

1. Test the radio for functionality.

2. Connect the ADD to the radio per the Hardware Installation section of this manual.

3. Program the ADD per the Product Programming section of this manual.

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

GENERAL INFORMATION

Midian's ADD Series products enable the dispatcher to identify radio users by decoding and displaying a 4 to 6 digit unit ANI or PTT ID depending on selected features, as well as users in distress when using the ENI.

TABLE OF CONTENTS

Specifications	2
Installation Overview	2
General Information	2
Hardware Installation	4
Hardware Alignment	5
Software Installation	6
Product Programming	6
Product Programming: General Tab	7
Product Programming: Input/Output Tab	7
Product Programming: RTC/Printer Options Tab	8
Product Programming: DTMF Options Tab	9
Product Programming: 5-Tone Options Tab	10
Product Programming: G-Star Options Tab	11
Product Programming: MDC Options Tab	12
Product Programming: FleetSync Options Tab	13
Operation	14
Technical Notes	14
Midian Contact Information	14

HARDWARE INSTALLATION

Be certain to follow standard anti-static procedures when handling Midian products. For installation instructions for a particular radio, please consult Midian's application notes for the ADD if available.

P1-1 – ANI Validate Out or Foot Pedal In – Gray Wire – These functions are only available on the ADD Revision B hardware.

1. **Foot Pedal Input:** In lieu of using the infrared remote control to stop the emergency alert tones or scroll the display, grounding this input will perform the same function.

2. **ANI Validation Output:** This wire can be used to give an output to a repeater for use as a repeater access controller. Upon decoding of a valid ANI an open collector output to ground will be given out this line.

P1-2 – COR Input – Orange Wire – Connect to a point in the radio's squelch or CTCSS circuit that changes logic level when a carrier is detected. If a high logic level is provided, remove jumper on JU4 and install the jumper on JU3. If a low logic level is provided, remove jumper on JU3 and install the jumper on JU4. A radio whose squelch circuit provides a logic-low or high can readily turn Q1 on and off. If the squelch/CTCSS point only makes a small change in voltage, it may be necessary to adjust the values of R39 and R40 for Q1 to change states. If the COR is not being used, remove JU4, install JU3 and the COR polarity should be programmed as Ground.

P1-3/P1-4 – RX 600-Ohm Balanced – Violet & Yellow Wires – This is a 600-Ohm balanced input that is used when the system is directly connected to a balanced 600 ohm line. This might be connected to a Microwave, dry phone line across a tone remote, or a balanced output from a base station/repeater. If you do not have or need a balanced line use the RX HI-Z input below.

P1-5/P1-6 – B+ – Red Wire – Connect to a 13.5 to 18 VDC power source in the radio or use the optional wall power adaptor (ADD Option B) and the Power Jack at (P4).

P1-7/P1-9 – Ground – Black Wire – Connect to ground in the radio.

P1-8 – RX Input (High Impedance) – White Wire – Connect this point to the high side of the volume control (preferred) or to discriminator audio after the CTCSS high-pass filter.

P1-10 – External Alarm – Brown Wire – This output uses an open collector to pull a horn or light to ground (~200 mA) to give a remote indication of an emergency ANI. There is a son-alert alarm in the box that is sufficient for most applications.

P2- Factory Use Only

P3 – Serial Printer Output/ Real Time Clock – For this feature ADD Option D must be ordered and is only available on revision B hardware. This connection is an optional feature and when installed will produce a Date/Time Stamp and the decoded ANI/ENI as a serial output. The ANI/ENI output will show the entire ANI/ENI that was decoded plus a status digit if applicable. This output can be used with a serial based printer or can be captured by the PC using software that is designed to capture serial data.

P4 – Power Input – For this feature ADD Option B must be ordered or a customer supplied power supply can be used as well. This can be connected to a wall adapter that supplies up to 18 VDC. This connector is designed for a positive center post polarity. If a wall adapter is used, do not connect P1-5/P1-6 to the radio's voltage supply or damage to the equipment may occur. However, the Ground (P1-7/P1-9) must still be connected.

P5 – Programming Jack – This jack is used to program the ADD unit with the KL-3 and KL-3 Option A.

HARDWARE ALIGNMENT

ADD-100/200/400/500/600/MF

Input Level: Apply a signal that fully quiets the receiver, modulated by a 1000 Hz tone at ±3.3 KHz (wideband) to the receiver (1.65 kHz for narrowband). While monitoring TP1, adjust R2 just below clipping.

DTMF Timing: If needing to decode DTMF at a rate faster than the standard 10-digits per second (60 on/40 off), R-9 can be changed to accommodate the faster timing. For 15-digits per second (45 on/30 off), change R-9 to a 390K resistor. For 20-digits per second (30 on/20 off), change R-9 to a 270K resistor. Please note that when DTMF is done at a faster rate the chance of falsing due to voice talk off and noise increases. While Midian will not recommend operating this product outside of normal industry specification, Midian suggests using 5 or more digits per ANI to help reduce/filter potential false decodes when using faster timing. It is Midian's policy to recommend that this product be operated within the normal industry specifications. If the product is operated outside of the specification range, Midian will not be able to assist with decode reliability issues.

ADD-400 Decoder PLL Adjustment:

The phase-locked-loop is pre-adjusted at the factory and should not need adjustment. In the event that it does require adjustment, perform the following steps:

1. Ground U8-9.

2. While observing U8-4 with a frequency counter or oscilloscope, adjust R28 such that 18 kHz is measured at U8-4 (TP7).

3. Remove ground from U8-9. While observing U8-4 (TP7) with a frequency counter or oscilloscope, adjust R-26 such that 25.6 kHz is measured at U8-4 (TP7).

SOFTWARE INSTALLATION

Insert the CD into the CD-ROM drive and close the drive. The CD will auto-run. Click on the side menu bar for miscellaneous software and select the ADD Series software. Follow the set-up procedures.

PRODUCT PROGRAMMING

Main Window:

File Menu: Here the user can open previously saved data files for the ADD unit or save a new data file.

Options Menu: Allows the user to specify which serial port is used to program the ADD unit.

Read Unit: Allows the user to read the configuration parameters in the currently connected ADD unit.

Program Unit: Allows the user to program the current configuration into the ADD unit.

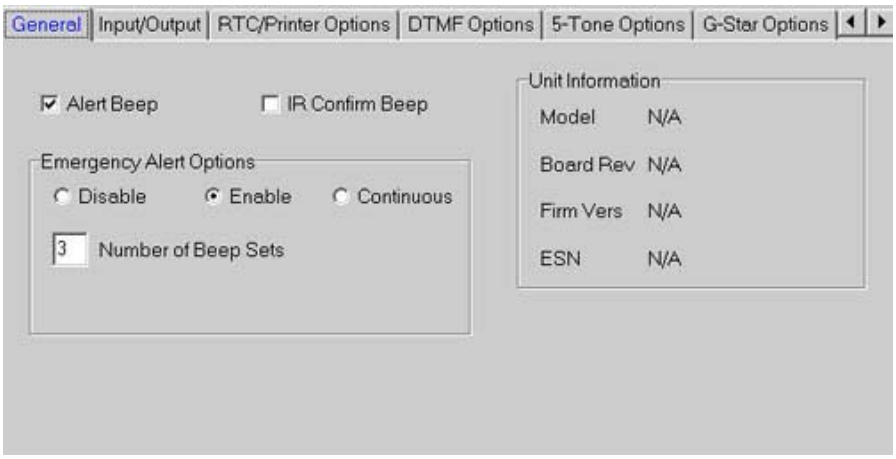
Help: Access to the Online Help Files and Version Information for this application.

For an explanation of the fields in the setup of the ADD Series software, simply right click over the title of the field and a help window will open with an explanation of the feature.

The KL-3 with the KL-3 Option A plugs into the programming jack P5. After setting the parameters to the desired setting click Program Unit.

Note: Prior to writing to the ADD unit, the RX Input must either be quieted or disconnected and do not program during the power up sequence. If there is noise present at the RX Input during programming, it may interfere with programming and result in EEPROM corruption.

General Tab:



Alert Beep: Enabling this feature causes the ADD to give an audible tone to indicate an ANI has been decoded.

IR Confirm Beep: Enabling this feature causes the ADD to give an audible tone to indicate the ADD has received a command from the IR remote control.

Emergency Alert Options:

Disable: When disabled the ADD will not give any audible alert when an Emergency ANI is decoded.

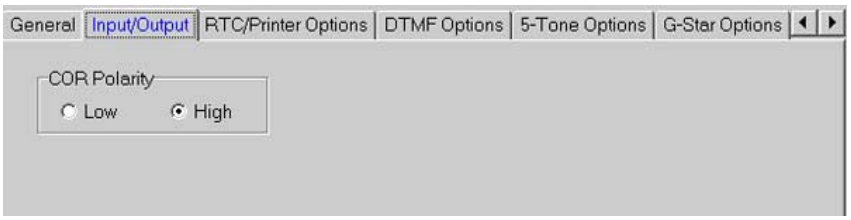
Enable: When enabled the ADD will give an audible alert when an ENI is decoded.

Continuous: When enabled the ADD will give an audible alert when an ENI is decoded. The alert will continue until reset by the IR remote control.

Number of Beep Sets: When the Emergency Alert is enabled this field sets the number of times the Emergency Alert will sound.

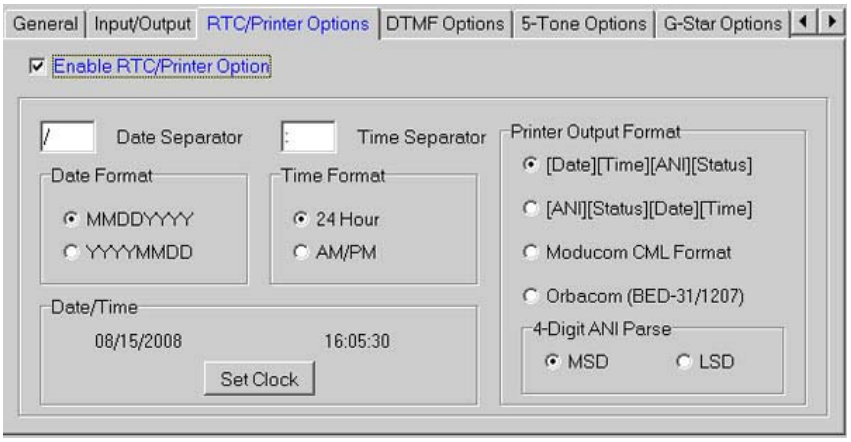
Unit Information: Depending on the unit purchased, when the ADD is read, the model, board revision, firmware version and ESN will be displayed in this section.

Input/Output Tab:



COR Polarity: This field sets whether the ADD looks for a high (5V) or a low (ground) to validate an ANI decode.

RTC/Printer Options Tab:



Note: To use the functions on this tab the ADD Option D must be ordered. The ADD Option D is the RS-232 output and serial cable option.

Date Separator: This sets the character that separates the months, days and years.

Date Format: Selects the format the date will be displayed.

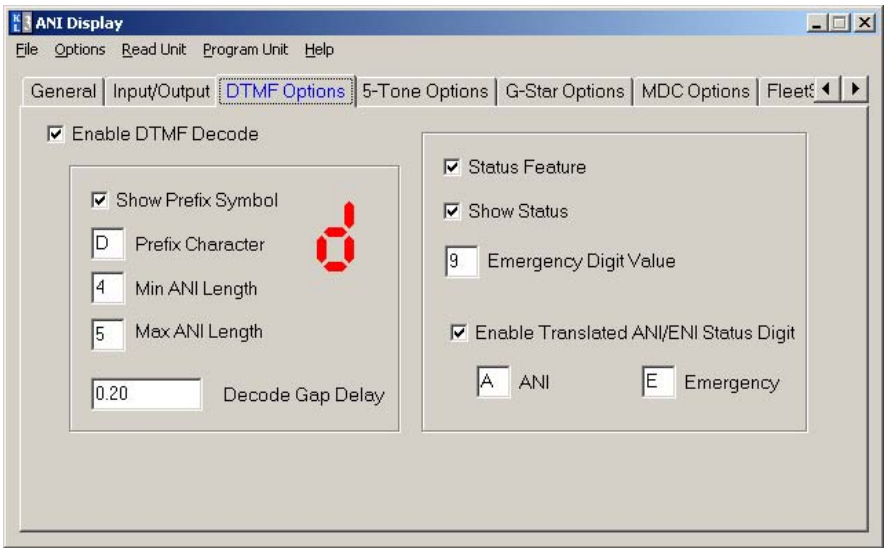
Time Separator: This sets the character that separates the hours, minutes and seconds.

Time Format: This sets the format the time will be displayed.

Printer Output Format: This sets the way the serial information will be sent out the printer port. If connecting to a Moducom or Orbacom (IPC) console you would select the desired format.

4-Digit ANI Parse: This is only used with the Moducom or Orbacom Printer Output Format options. This will remove either the Most Significant Digit (MSD) (i.e. 12345 will result in 1234 being displayed) or the Least Significant Digit (LSD) (i.e. 12345 will result in 2345 being displayed).

DTMF Options Tab: ADD-100 & ADD-MF Only



Enable DTMF Decode: Check this box if using the ADD-100 or ADD-MF and DTMF ANI decode is desired.

Show Prefix Symbol: Check this box if you wish to designate a character to represent a signaling format on the display. This is particularly helpful on the ADD-MF.

Prefix Character: If using the Prefix Symbol, this sets the character to be used. For DTMF Midian recommends using the “d” character.

Min ANI Length: This can be set from 1 to 8 digits. It should not be set higher than the maximum length. This field represents the minimum number of digits required for a valid decode after the decode time has been satisfied.

Max ANI Length: This can be set from 1 to 8 digits. It should not be set lower than the minimum length. This field represents the maximum number of digits plus the status digit, if enabled, that can be decoded. If the decoded number of digits is longer than this value, it will be ignored.

Decode Gap Delay: This sets the length of time after the last digit in the ANI sequence is decoded before the ADD will display the ID. This time should be set longer than the DTMF gap time (time between digits).

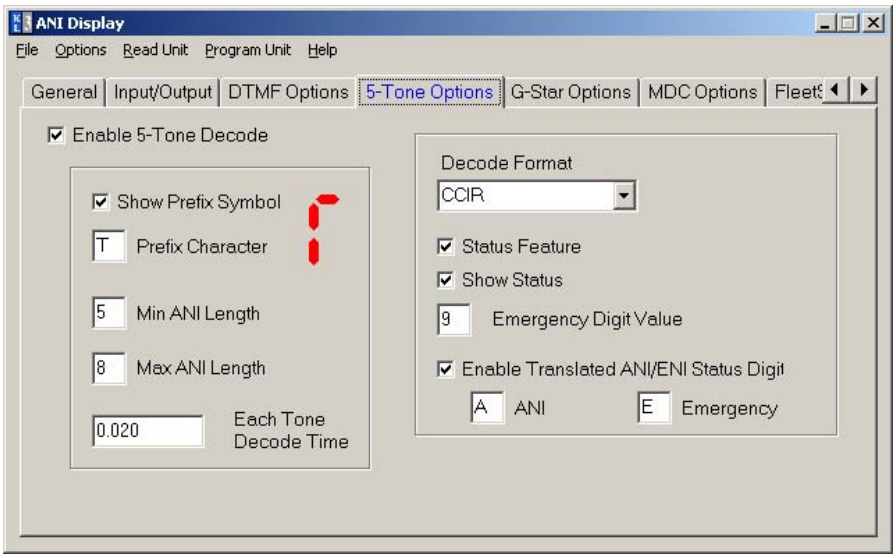
Status Feature: Checking this box to enable decoding of the Emergency ANI.

Show Status: Checking this box will cause the status digit to display on the screen.

Emergency Digit Value: This sets the DTMF digit that will be interpreted as an Emergency. Most systems use 9 as the Emergency status digit.

Enable Translated ANI/ENI Status Digit: The ADD can use one of the 6 character displays to show a character that represents the ANI sequence as either a regular ANI or an Emergency ANI.

5-Tone Options Tab: ADD-200 & ADD-MF Only



Enable 5-Tone Decode: Check this box if using the ADD-200 or ADD-MF and 5-Tone ANI decode is desired.

Show Prefix Symbol: Check this box if you wish to designate a character to represent a signaling format on the display. This is particularly helpful on the ADD-MF.

Prefix Character: If using the Prefix Symbol, this sets the character to be used. For 5-Tone Midian recommends using the "T" character.

Min ANI Length: This can be set from 1 to 8 digits. It should not be set higher than the maximum length. This field represents the minimum number of digits required for a valid decode after the decode time has been satisfied.

Max ANI Length: This can be set from 1 to 8 digits. It should not be set lower than the minimum length. This field represents the maximum number of digits plus the status digit, if enabled, that can be decoded. If the decoded number of digits is longer than this value, it will be ignored.

Each Tone Decode Time: The ADD samples 5-Tone signaling for decode. This time should be set to approximately $1/5^{th}$ or $1/6^{th}$ of the time that each tone is encoded. For instance, if each 5-Tone digit is encoded at a rate of 70 msec, then the decode time should be 0.015.

Decode Format: This sets the format of 5-Tone that is being used such as EIA, EEA, CCIR, ZVEI, etc. The ADD can only be programmed to decode one format of 5-Tone.

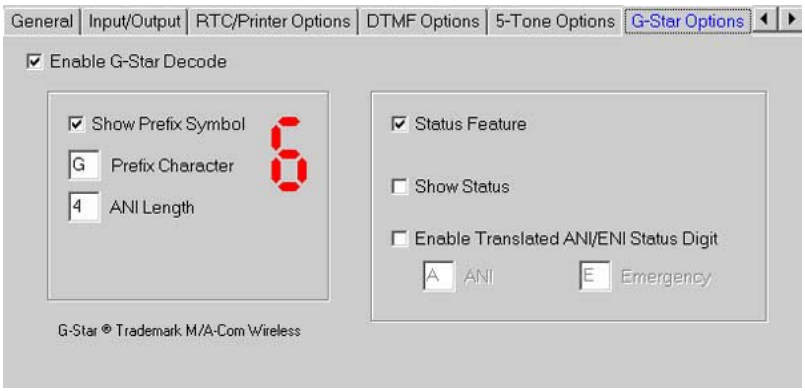
Status Feature: Checking this box to enable decoding of the Emergency ANI.

Show Status: Checking this box will cause the status digit to display on the screen.

Emergency Digit Value: This sets the DTMF digit that will be interpreted as an Emergency. Most systems use 9 as the Emergency status digit.

Enable Translated ANI/ENI Status Digit: The ADD can use one of the 6 character displays to show a character that represents the ANI sequence as either a regular ANI or an Emergency ANI.

G-Star Options Tab: ADD-400 & ADD-MF Only



Enable G-Star Decode: Check this box if using the ADD-400 or ADD-MF and G-Star ANI decode is desired.

Show Prefix Symbol: Check this box if you wish to designate a character to represent a signaling format on the display. This is particularly helpful on the ADD-MF.

Prefix Character: If using the Prefix Symbol, this sets the character to be used. For G-Star Midian recommends using the “G” character.

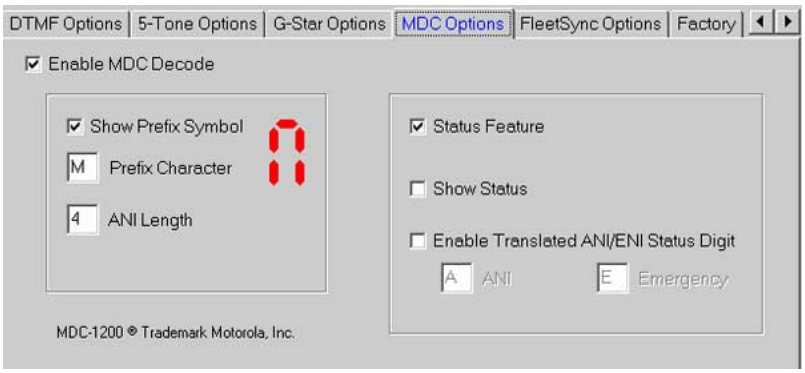
ANI Length: This sets how many digits each ANI should be for decoding. If more or less digits are decoded, the ADD will not display the sequence.

Status Feature: Checking this box to enable decoding of the Emergency ANI.

Show Status: Checking this box will cause the status digit to display on the screen.

Enable Translated ANI/ENI Status Digit: The ADD can use one of the 6 character displays to show a character that represents the ANI sequence as either a regular ANI or an Emergency ANI.

MDC Options Tab: ADD-500 & ADD-MF Only



Enable MDC Decode: Check this box if using the ADD-500 or ADD-MF and MDC-1200 ANI decode is desired.

Show Prefix Symbol: Check this box if you wish to designate a character to represent a signaling format on the display. This is particularly helpful on the ADD-MF.

Prefix Character: If using the Prefix Symbol, this sets the character to be used. For MDC-1200 Midian recommends using the “M” character.

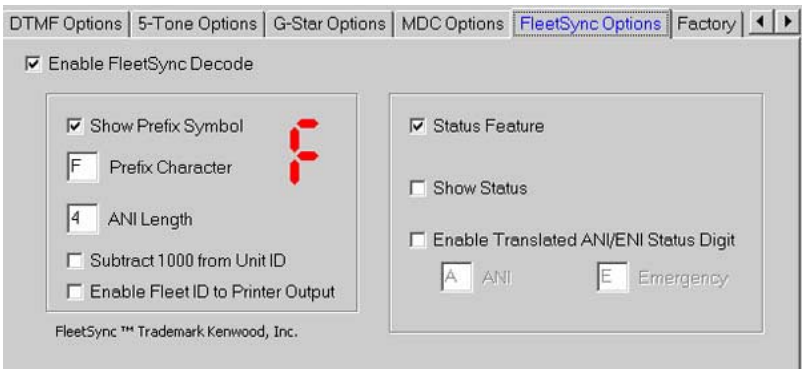
ANI Length: MDC-1200 is only 4-digits in length.

Status Feature: Checking this box to enable decoding of the Emergency ANI.

Show Status: Checking this box will cause the status digit to display on the screen.

Enable Translated ANI/ENI Status Digit: The ADD can use one of the 6 character displays to show a character that represents the ANI sequence as either a regular ANI or an Emergency ANI.

FleetSync Options Tab: ADD-600 & ADD-MF Only



Enable FleetSync Decode: Check this box if using the ADD-600 or ADD-MF and FleetSync ANI decode is desired.

Show Prefix Symbol: Check this box if you wish to designate a character to represent a signaling format on the display. This is particularly helpful on the ADD-MF.

Prefix Character: If using the Prefix Symbol, this sets the character to be used. For FleetSync Midian recommends using the “F” character.

ANI Length: FleetSync is only 4-digits in length.

Subtract 1000 from Unit ID: This causes the ADD to only display the last 3 digits on the Unit ID.

Enable Fleet ID to Printer Output: If using the ADD Option D, the ADD can output the Fleet ID to the serial output. The Fleet ID cannot be displayed on the ADD itself.

Status Feature: Checking this box to enable decoding of the Emergency ANI.

Show Status: Checking this box will cause the status digit to display on the screen.

Enable Translated ANI/ENI Status Digit: The ADD can use one of the 6 character displays to show a character that represents the ANI sequence as either a regular ANI or an Emergency ANI.

OPERATION

ANI Decode: Upon decoding of an ANI the ADD will display up to 6 digits of the ANI. If the ANI exceeds 6 digits then only the first 6 digits will be displayed. If a preceding format character is used, then the format digit will be display followed by the first 5 digits of the ANI.

Emergency ANI (ENI) Decode: Upon decoding of an ENI the ADD will display the ANI followed by an emergency status digit (DTMF & 5-Tone only) or an emergency status character (any format). Like the ANI the ADD will only display a total of 6 characters. If a preceding format digit is displayed and the emergency character is displayed, then that leaves 4 digits for the ID. If the ID exceeds 4 digits then the first 4 will be displayed.

Infrared Remote Controller: The IR Controller is used to cancel emergency alert tones and to scroll through the last 6 ID's. Pressing the left (up) or right (down) arrow buttons scrolls thru the ANI's on the display while the bottom button (AV/TV) silences the alarm tone following an emergency ANI. The decimal point indicates the position of the ANI in the order in which they were received. When scrolling past the oldest ID in the database the unit will return to the most recent ID. The decimal point will flash to indicate where an emergency ANI is located in the event of successive ANI sequences.

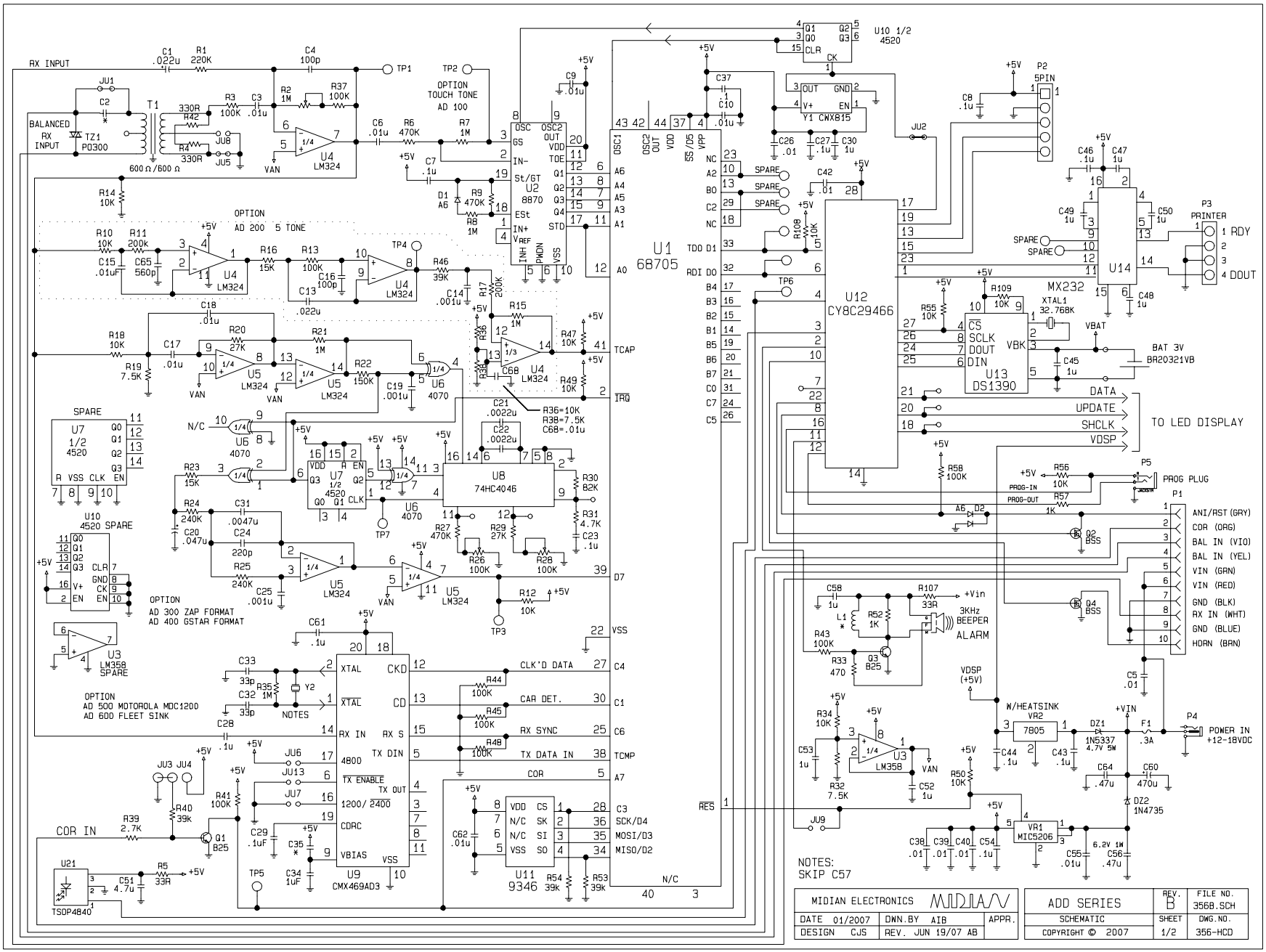
TECHNICAL NOTES

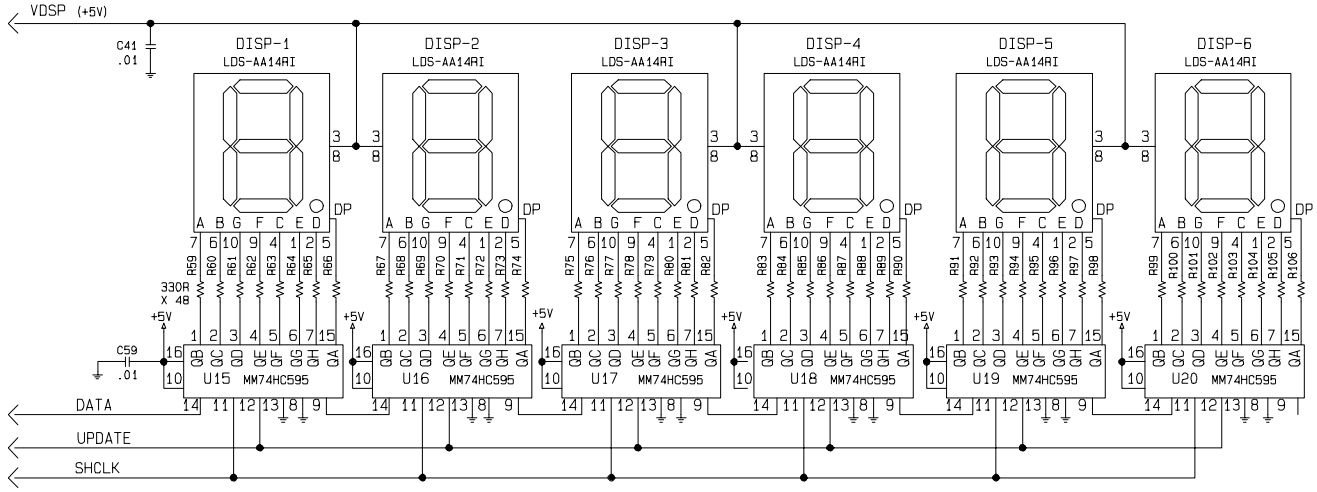
Radio Compatibility: Midian has taken the utmost care to ensure the ADD unit integrates with the radio with minimal impact to the features of the radio. However, some features may not be available in the radio when an ADD unit is used. If a feature is not available, please contact Midian to see if the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

MIDIAN CONTACT INFORMATION

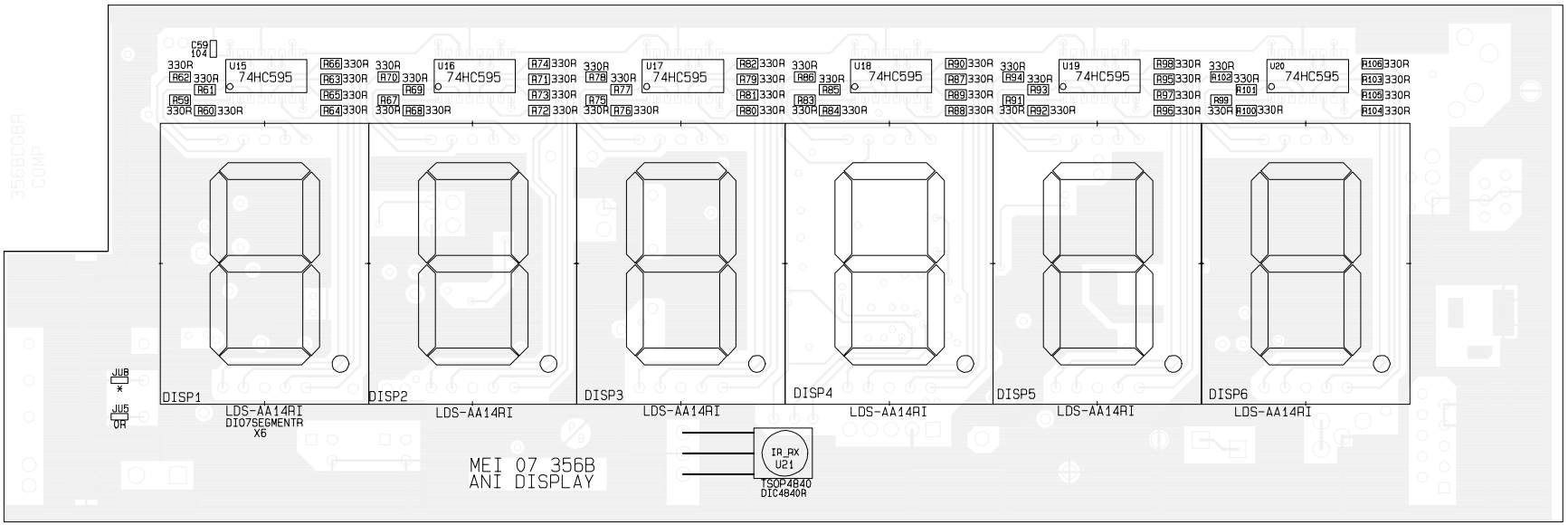
Midian Electronics, Inc.
2302 East 22nd Street
Tucson, Arizona 85713 USA

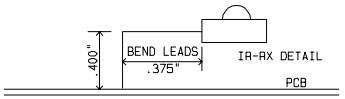
Orders: 1-800-MIDIANS
Phone: 520-884-7981
Fax: 520-884-0422
E-mail: sales@midians.com
Web: www.midians.com


RX INPUT
BALANCED RX INPUT
TZ1 PQ300
600Ω/800Ω
OPTION TOUCH TONE AD 100
OPTION AD 200 5 TONE
U1 68705
U2 8870
U4 LM324
U5 LM324
U6 4070
U7 1/2 4520
U8 74HC4046
U9 CMX469AD3
U10 4520 SPARE
U11 9346
U12 CY8C29466
U13 DS1390
U14 MX232
U10 1/2 4520
Y1 CWX815
XTAL1 32.768K
BAT 3V BR20321VB
P1
P2 5PIN
P3 PRINTER
P4 POWER IN +12-18VDC
P5 PROG PLUG
TO LED DISPLAY
DATA
UPDATE
SHCLK
VDSP
PROG-IN
PROG-OUT
ANI/RST (GRY)
COR (ORG)
BAL IN (VIO)
BAL IN (YEL)
VIN (GRN)
VIN (RED)
GND (BLK)
RX IN (WHT)
GND (BLUE)
HORN (BRN)
3KHz BEEPER ALARM
W/HEATSINK
7805
1N5337 4.7V 5W
1N4735
MIC5206
6.2V 1W
OPTION AD 300 ZAP FORMAT AD 400 GSTAR FORMAT
OPTION AD 500 MOTOROLA MDC1200 AD 600 FLEET SINK
COR IN
TSOP4840
NOTES: SKIP C57
MIDIAN ELECTRONICS
ADD SERIES
SCHEMATIC
COPYRIGHT © 2007
DATE 01/2007
DESIGN CJS
DWN.BY AIB
REV. JUN 19/07 AB
APPR.
REV. B
FILE NO. 356B.SCH
SHEET 1/2
DWG.NO. 356-HCD



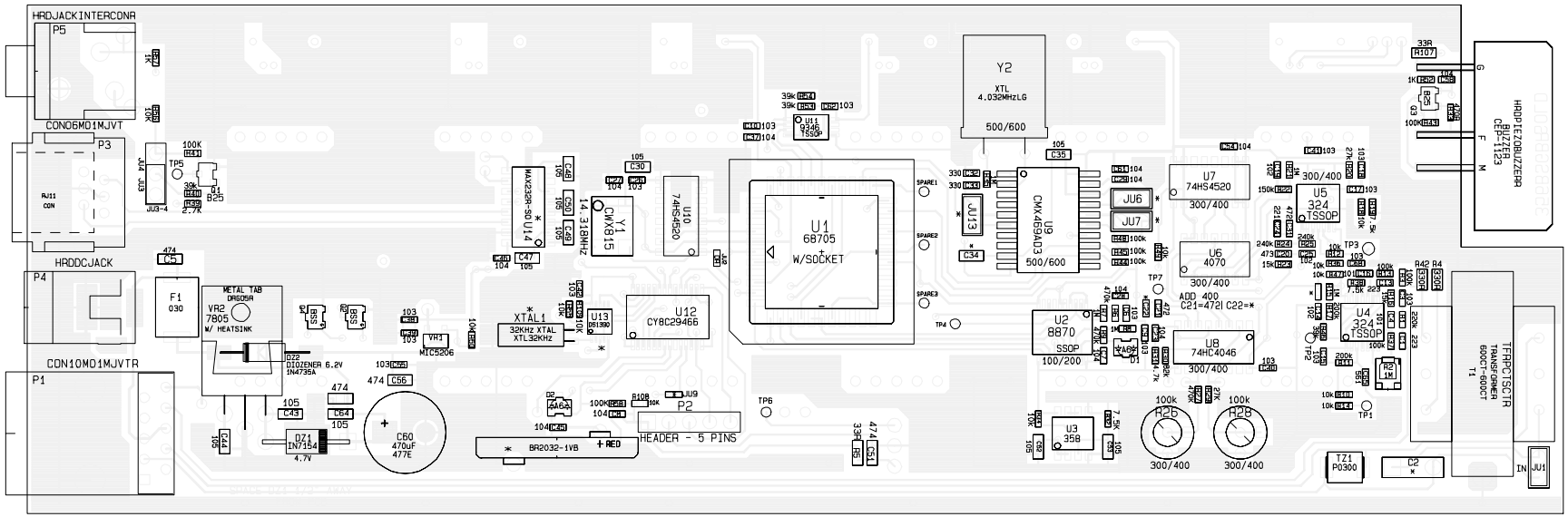
MIDIAN ELECTRONICS			ADD SERIES	REV. B	FILE NO. 356B.SCH
DATE 01/2007	DWN.BY AIB	APPR.	SCHEMATIC	SHEET 2/2	DWG.NO. 356-HCD
DESIGN CJS	REV. JUN 19/07 AB		COPYRIGHT © 2007		





MIDIAN ELECTRONICS			
DATE 01/2007	DWN.BY AIB	APPR.	
DESIGN CJS	REV. JUN 19/07 AB		

ADD SERIES	REV. B	FILE NO. 356B.SCH
PICTORIAL	SHEET	DWG.NO. 356-HCP
COPYRIGHT © 2007		



MIDIAN ELECTRONICS			
DATE 01/2007	DWN.BY AIB		APPR.
DESIGN CJS	REV. JUN 19/07 AB		

ADD SERIES	REV. B	FILE NO. 356B.SCH
PICTORIAL	SHEET	DWG.NO. 356-HCP
COPYRIGHT © 2007		