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MODEL NC401 TOUCH-TONE* DECODER INSTRUCTION MANUAL

INTRODUCTION

The Model NC401 is a unique micro-miniature Touch-Tone[®] Decoder, designed for selective signalling of fleet dispatched vehicles, mobile telephone systems or for control of remote applications. The NC401 combines three distinct, multi-addressable DTMF Decoders in one highly versatile unit, offering multiple user-configurable output functions through microcontroller technology and NorComm's custom software. The NC401 decodes all 16 standard DTMF characters, with address lengths of 1 to 14 digits and features E²PROM memory for non-volatile storage of programmed codes, input and output functions, remote programming, deadbeat disable & user outputs, plus Default Reset.

The Model NC401 is easily programmed by means of a conventional DTMF Encoder or NorComm's Model NC500 Universal/P.C. Field Programmer. All information programmed remains intact regardless of power interruptions. Coupled with NorComm's unique software design and integrated DTMF filter/detector, the NC401 equips your communications network with a high stability dynamic DTMF Decoder that is totally user friendly.

SPECIFICATIONS

SIGNAL FORMAT Decodes all 16 standard DTMF (Touch Tone[®]) characters.

[PRIMARY 1, 2 & 3] CODE CAPACITY Field programmable using any of the 16 standard DTMF characters with an address length of 1 to 14 digits.

[SECONDARY] CODE CAPACITY Field programmable using any of the 16 standard DTMF characters with an address length of 1 to 14 digits.

[REMOTE PROGRAMMING] CODE CAPACITY Field programmable using any of the 16 standard DTMF characters with an address length of 3 digits.
NOTE: This feature is a factory activated option.

[GROUP/ALL CALL] CODE CAPACITY Field programmable using any of the 16 standard DTMF characters with an address length of 1 digit.

DECODE ALGORITHM The Decoding Algorithm is designed to decode all possible code combinations. As an example, decoders used in the same system and programmed to codes "1", "12", "123" and "1234" would not decode improperly even though they contain the same correct codes within their sequences.

PROGRAMMING METHOD Field programmable by use of a standard 12 or 16 button DTMF encoder or optional Model NC500 Universal/P.C. Field Programmer. **No more programming by wire jumpers, code plugs or DIP switches.**

MEMORY Programmable data is stored in non-volatile E²Prom memory with 40 years data retention and will remain regardless of power interruptions. Requires no batteries.

DECODE DELAY/INTER-DIGIT TIMEOUT Programmable from 200ms to 12 sec.

WRONG DIGIT RESET Digit counter resets to zero if programmed digits sent exceed interdigit time-out, out of sequence or wrong digit is received.

DECODE LOGIC INTERFACING Hexadecimal/Strobe outputs of all DTMF characters plus serial input/output of all decoder functionality (Contact factory for more information).

INPUT SIGNAL LEVEL 10mVRMS to 650mVRMS

INPUT IMPEDANCE 50K Ohms

tone ACCEPTANCE B.W. 2.5%

CTCSS REJECTION 24dB @ 130Hz

DIAL TONE REJECTION Notches at 350Hz and 440Hz

TWIST ~10dB

S/N RATIO <10dB SINAD

TIME BASE Crystal controlled (3.5795 MHZ)

DATA RATE 0.4 to 14 Digits per second (DPS)

OPERATING VOLTAGE 5.5VDC to 24VDC

OPERATING CURRENT <10mA

OPERATING TEMPERATURE ... -20°C to +80°C

INTERFACING Micro-miniature 14 pin Molex header and 12" color coded cable assembly.

SIZE80" W x 1.37" L x .23" H 20.30mm W x 34.77mm L x 5.80mm H

MOUNTING Double sided adhesive tape.

SPECIFICATIONS ARE SUBJECT TO CHANGE IN THE INTEREST OF TECHNICAL IMPROVEMENT WITHOUT NOTICE OR OBLIGATION

THEORY OF OPERATION

PRIMARY DECODER

The Primary 1, 2 and 3 address codes are field programmable using any of the 16 standard DTMF characters with an address length of 1 to 14 digits.

Upon a valid decode, the Primary Decoder provides the following user selectable functions: Latched Output, Call Light Output, Momentary Output, Tone Alert Output, Transponder Functions and Latched Output Reset Timer. Primary 1 DEFAULT=[CODE 123], Primary 2 and 3 DEFAULT=[NO CODE].

All decoders are preprogrammed to factory default setting, and are noted under each feature in [BRACKETS]. The factory default reset feature, when activated, resets all programmed features to factory default values. This is helpful if programmed configurations are unknown.

Latched Output: Program selectable for active "HIGH" or "LOW". Jumper selectable for output sink or source.
DEFAULT=[LOW]

Call Light Output: Program selectable for "Steady" or "Pulsating" at a 2 Hertz rate.
DEFAULT=[PULSATING]

Momentary Output: Program selectable for "Steady" or "Pulsating" for a duration of Ø to 12 seconds or minutes and will terminate upon programmed duration, call reset or activation of Monitor/Reset input. [Ø = Disabled]
DEFAULT=[STEADY/2 SEC.]

Tone Alert Output: Program selectable for continuous (simulated phone ring) or a duration of 1 to 12 seconds with alternating 1200/600 Hertz tone and will terminate upon programmed duration, call reset or activation of monitor/reset input.
DEFAULT=[2 SEC.] [Ø = Continuous]

Decode Delay Program selectable for a decode delay of 0.2 to 12 seconds from end of last digit in code sequence. [Ø = 200ms]
DEFAULT=[1 SEC.]

Transponder Functions: Transpond TX Keying and Transpond Tone are activated simultaneously upon decode and are program selectable for a duration of Ø to 12 seconds. Primary Decode Transpond provides a 125ms pulsed, 1200 Hertz tone will terminate upon programmed duration, call reset or activation of Monitor/Reset input. [Ø = Disabled]
DEFAULT=[3 SEC.]

Timed Latched Reset: Resets all Primary Decoder functions except Call Light Output. Program selectable for a Reset delay of Ø to 12 minutes. [Ø = Disabled]
DEFAULT=[DISABLED]

Call Reset: The Reset digit can be selected from any 1 of the 16 standard DTMF characters. Upon reception of the Primary code followed by the selected Reset digit, all Primary decoded functions are reset and then acknowledged by a steady 1200 Hertz Transpond Tone for selected duration.
DEFAULT=[7]

Group Call: The Group Call address code is field programmable using any 1 of the 16 standard DTMF characters. Upon reception of a single-digit Group Call address for a duration of 3 seconds, or if Primary 2 or 3 has been selected for multi-digit Group Call address, all Primary Decoder functions selected will be activated with the exclusion of Momentary and Transpond Output Functions.
DEFAULT=[*]

All Call: The All Call address code is field programmable using any 1 of the 16 standard DTMF characters. Upon reception of a single-digit All Call address for a duration of 3 seconds, or if Primary 2 or 3 has been selected for multi-digit All Call address, all Primary Decoder functions selected will be activated with the exclusion of Momentary and Transpond Output Functions.
DEFAULT=[#]

Group Call Reset: The Group Call Reset digit can be programmed from any 1 of the 16 standard DTMF characters. All Primary decode functions are reset upon reception of Group Call address followed by reset digit for a duration of 3 seconds or immediate reset when using either Primary 2 or 3 address.
DEFAULT=[8]

All Call Reset: The All Call Reset digit can be programmed from any 1 of the 16 standard DTMF characters. All Primary decode functions are reset upon reception of All Call address followed by reset digit for a duration of 3 seconds or immediate reset when using either Primary 2 or 3 address.
DEFAULT=[9]

PTT Input: Program selectable for active "**Low**" or "**High**". Upon a momentary touch of the PTT switch, the primary latched output is activated to allow monitoring of channel before transmission. The PTT input also activates the T.O.T. and busy lock-out functions.
 DEFAULT=[**LOW**]

Transmit time-out timer: Program selectable from \emptyset to 120 sec.(\emptyset =Disabled). Timer starts each time PTT input is activated. Upon time-out, (T.O.T.)- the Transpond PTT output returns to its inactive state and a 125ms pulsating 1800 Hertz tone is generated at the tone alert output. This condition continues until the PTT switch is released, at which time the pulsating tone stops and the T.O.T. is reset. **NOTE:** The NC401 PTT input and TX Keying output leads must be connected in series with transmitter PTT circuitry to utilize this feature.
 DEFAULT=[**120 SECS.**]

Busy lock-out: Program selectable for active "**LOW**" or "**HIGH**". Upon an active input, the PTT input is disabled. (If Busy Lock-out active state returns to inactive state while PTT is depressed, PTT input must first be released before PTT function is enabled.) A 125ms pulsating 1800 Hertz tone is generated at the tone alert output if the PTT input is activated during busy lock-out. This function is to alert user that channel is in use. **NOTE:** The NC401 PTT input and TX Keying output leads must be connected in series with transmitter PTT circuitry to utilize this feature.
 DEFAULT=[**HIGH**]

Monitor/Reset Input: Program selectable for Monitor "**Low**" or Monitor "**High**". Resets all decoded functions or activates Latched Output circuitry for monitoring.
 DEFAULT=[**HIGH**]

PTT/TX Keying Select: Program selectable for one of two modes. **COMMON MODE:** Allows the PTT Input and Keying Output to be connected to a single point in the transceivers transmitter circuitry without a lock-up condition occurring. The busy Lock-Out and T.O.T. are disabled in this mode. **FOLLOWING MODE:** Used when busy lock-out and/or T.O.T. are desired and the user breaks the PTT line in the transceiver. This gives the NC401 full control over the transceivers PTT function while maintaining standard PTT operation.
 DEFAULT=[**FOLLOWING**]

SECONDARY DECODER

The Secondary Decoder is distinct from the Primary Decoder and responds to a separate address code. The Secondary address code is field programmable using any of the 16 standard DTMF characters with an address length of 1 to 14 digits. The Secondary Decoder operates in either of two selectable modes: **User Option** or **Deadbeat Disable**. In the **User Option** Mode, upon a valid decode, the secondary Decoder provides a Latched/Timed Output and Transponder Functions. In the **Deadbeat Disable** Mode, upon a valid decode, the secondary decoder provides a latched output and will reset and disable all primary decoded functions. The status of either mode is stored in non-volatile memory and will remain regardless of power interruptions. DEFAULT=[**CODE 456/USER MODE**]

All decoders are preprogrammed to factory default setting, and are noted under each feature in [BRACKETS]. The factory default reset feature, when activated, resets all programmed features to factory default values. This is helpful if programmed configurations are unknown.

User Option Mode

Latched Output: Program selectable for active "**HIGH**" or "**LOW**" Latched Output.
 DEFAULT=[**HIGH**]

Latched Timed Reset Automatically resets Auxiliary Latched Output. Program selectable for a reset delay of \emptyset to 12 seconds.
 DEFAULT=[**DISABLED**]

Transponder Functions: Upon a valid decode, Transpond TX Keying and Transpond Tone are activated simultaneously and provide a steady 600 Hertz tone frequency for a duration of 2 seconds.

Call Reset: The Secondary Reset digit can be programmed from any 1 of the 16 standard DTMF characters. Upon reception of the Secondary code followed by the selected Reset digit, the latched output is reset and then is acknowledged by a 125ms pulsed 600Hertz tone for a duration of 2 seconds.
 DEFAULT=[\emptyset]

Deadbeat Disable Mode

Latched Output Program selectable for active "**HIGH**" or "**LOW**" Latched Output.
 DEFAULT=[**HIGH**]

Transponder Functions: Upon a valid decode, Transpond TX Keying and Transpond Tone are activated simultaneously and provide a 125ms alternating tone (600/1200Hz) for a duration of 2 seconds.

Deadbeat Disable Check: The Decoder may be interrogated repeatedly for verification of Deadbeat status. Upon a valid decode, Secondary Decoder Transpond TX keying and Transpond Tone are activated while all other Decoder functions remain disabled.

Call Reset: The Reset digit can be programmed from any 1 of the 16 standard DTMF characters. Upon reception of the Secondary code followed by the selected Reset digit, the Latched Output is reset, all primary functions are enabled and then is acknowledged by a 125ms pulsed 600Hertz tone for a duration of 2 seconds.
 DEFAULT=[\emptyset]

Remote Programming (FACTORY OPTION)

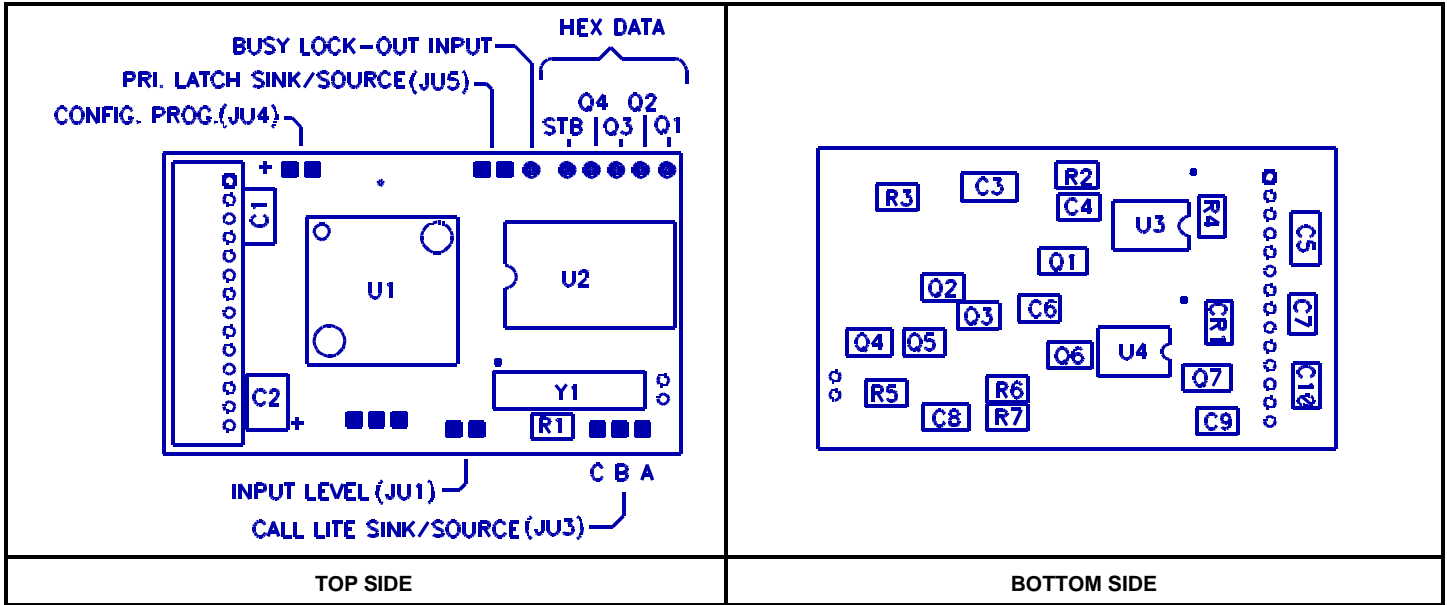
The third decoder is distinct from the primary and secondary decoders and responds to a separate three (3) digit address. The 3 digit address must be initially programmed by the factory and then can be user reprogrammed to any 3 digit code combination, using any of the 16 standard DTMF characters.

INTERFACING INSTRUCTIONS

The Model NC401 comes complete with factory programmed default settings (See "Theory of Operation" pages 2 through 4), a 14 pin micro-miniature cable assembly and a piece of double sided adhesive tape to eliminate the need for mounting hardware. **NOTE:** When feature programming is completed, remove the protective covering from one side of the tape; and apply to the bottom surface of the P.C. board. Now remove protective covering from remaining side of tape and apply unit to desired location. Surface must be clean and dry to insure positive mounting. Although the Model NC401 is engineered for maximum immunity to R.F., it is suggested that all leads be kept to minimum lengths and away from transmitter final circuitry.

- BROWN** Default programmed to set latched output "**LOW**" (To ground) when grounded. This configuration is useful when connected to microphone hang-up box. Removing this lead from ground:
[MONITOR/RESET] [A] Resets all decoded functions.
[B] Will activate latched output circuitry for monitoring of channel.
- RED** Connect to 5.5VDC to 24VDC. **WARNING: Do not connect to a D.C. source with a slow rise time as it will affect the power-on reset of the microprocessor.**
[+SUPPLY]
- ORANGE** Default programmed for latched "**LOW**" (To ground). This output is an open collector transistor, factory-jumpered to sink to ground 100mA @ 40Vce. To reverse this configuration, program Primary latched output for decode "**HIGH**" (Hi-Z output). To select source output, remove solder jumper JU5. **NOTE:** Source output is through a 4.7K ohm resistor from +5VDC. (See "**TOP SIDE**" of Component Locator on page 5 for location of JU5).
[PRIMARY LATCHED SINK/SOURCE OUTPUT]
- BLUE** Default programmed for **2 seconds of steady** output. This output is a N-Channel Power MosFet and will sink to ground 200mA @ 50Vds. **WARNING: To prevent damage to the MosFet when used to control vehicle's horn, place a 1N4005 diode or equivalent across horn relay.**
[MOMENTARY OUTPUT]
- VIOLET.** Default programmed for 2 seconds. Connect to receiver's audio output circuitry **NOT** controlled by the squelch circuitry. This will prevent muting of the alert tone when the receiver is squelched. This output is D.C. blocked & will require an external resistor in series with this lead to prevent circuitry loading and for setting audio input level.
[DECODE/T.O.T./ BUSY LOCK-OUT/ TONE ALERT OUTPUT]
- GRAY** Default programmed for PTT "**LOW**". Connect to transceiver circuitry that provides a low when keyed. To connect to circuitry that provides a high when keyed, program this function for PTT high. **NOTE:** The decoder must be placed in series with transceiver's PTT line and PTT/TX keying select set for following mode to enable use of T.O.T. and Busy Lock-out.
[LATCH/T.O.T./PTT INPUT]
- WHITE** Default programmed for pulsating operation and is factory jumpered as a N-Channel Power MosFet and will sink to ground 200mA @ 50Vds. To source output, remove solder bridge jumper between pads JU3-B and JU3-C and solder bridge jumper pads JU3-A and JU3-B. **NOTE:** Sourced output is current limited through a 1K ohm resistor from +A. (See "**TOP SIDE**" of Component Locator on page 5 for locations of JU3-A, JU3-B & JU3-C).
[CALL LITE SINK/SOURCE OUTPUT]
- BLACK** Connect to system ground.
[-SUPPLY]
- YELLOW** Default programmed for decode "**HIGH**" (HI-Z output). This output is a N-Channel Power MosFet and will sink to ground 200mA @ 50Vds.
[SECONDARY LATCHED/ TIMED OUTPUT]
- WHITE/BLUE** Default programmed for 2 seconds. Connect to transmitter PTT circuitry. This output is a N-Channel Power MosFet and will sink to ground 200mA @ 50Vds. **NOTE:** In order for this output to control PTT function for purpose of using T.O.T. and Busy Lock-out, decoder must be installed in series with transceiver's PTT line and PTT/TX keying select set for following mode.
[TRANSPOND/T.O.T./ BUSY LOCK-OUT KEYING OUTPUT]
- BLACK/WHITE** Connect to transmitter audio input circuitry. This output is D.C. blocked and will require an external resistor in series with this lead to prevent circuitry loading and for setting audio input level.
[TRANSPOND TONE OUTPUT]
- GREEN** Connect to receiver audio output circuitry such as the discriminator, or any amplifier stage **NOT** controlled by the squelch circuitry. **NOTE:** Unit is factory supplied with JU1 installed for input levels of 10mVRMS to 350mVRMS. For input levels of 350mVRMS to 650mVRMS remove solder bridge jumper from JU1 pads. (See "**TOP SIDE**" or Component Locator on page 5 for location of JU1 solder pads).
[AUDIO INPUT]
- BUSY LOCK-OUT INPUT Default programmed for active "**HIGH**". Connect to receiver's squelch circuitry that provides a \emptyset to +1.5VDC or greater when channel is busy. For reverse operation, program this function for active "**LOW**". Connect to squelch circuitry that provides a minimum of +1.5VDC and goes to \emptyset (Ground) when channel is busy. To use this feature solder a piece of wire from the **B.L.O.** pad to transceivers squelch circuitry that provides correct logic transition. (See "**TOP SIDE**" of Component Locator on page 5 for location of Busy Lock-Out solder pad).
[PAD ON P.C. BOARD]
- BINARY/STROBE OUTPUTS See "Hexadecimal Outputs" page 6.

COMPONENT LOCATOR



PROGRAMMING INSTRUCTIONS

The Model NC401 is field programmable via the 16 standard DTMF characters. Any DTMF encoder may be used; or if one is unavailable, an inexpensive field programmer is available from NorComm.

In order to program the NC401, the unit must have power applied and the audio input (GREEN wire) connected to encode out of the DTMF encoder. If the NorComm Field Programmer is being utilized, simply plug the NC401 into the plug assembly. Both audio and visual confirmation are provided via the tone alert and call light outputs while in the programming mode. The use of either output is recommended for ease of programming.

NOTE: The NC401 can be reset to factory defaults at any time by entering the Reset Factory Default Program line as listed at bottom of programming chart on page 8.

The program mode is entered by removing solder jumper JU4. Any feature may be programmed in any order. Each key entry is confirmed by an audible beep with a corresponding light flash. Each correctly entered program line is accepted with a series of audible beeps and light flashes. Any error or invalid program line entry results in a 1 second tone and light activation (the feature being programmed remains unchanged). The program line consists of the following entries: an *, followed by the address number of the desired feature, followed by a #, followed by the index number (if used) and the parameters.

Examples

To program a primary code of 1234:

1. Disconnect **power**.
2. Remove solder jumper JU4.
3. Connect audio input to DTMF Encoder.
4. Connect either audio or visual outputs as desired for programming acknowledgement.
5. Apply power.
6. Enter * 1 # 1234 and wait for confirmation.
7. Remove power and replace solder jumper JU4 or continue programming.

To program a Transpond tone for 5 seconds:

1. Disconnect **power**.
2. Remove solder jumper JU4.
3. Connect audio input to DTMF Encoder.
4. Connect either audio or visual outputs as desired for programming acknowledgement.
5. Apply power.
6. Enter * 7 # 25 and wait for confirmation.
7. Remove power and replace solder jumper JU4 or continue programming.

To program the momentary function for a pulsating output and a duration of 5 seconds:

1. Disconnect **power**.
2. Remove solder jumper JU4.
3. Connect audio input to DTMF Encoder.
4. Connect either audio or visual outputs as desired for programming acknowledgement.
5. Apply power.
6. Enter * 7 # 35 and wait for confirmation. (Sets 5)

7. Enter * 8 # 31 and wait for confirmation. (Sets pulsed)
8. Enter * 8 # 40 and wait for confirmation. (Sets seconds)
9. Remove power and replace solder jumper JU4 or continue programming.

NOTE: If you get a steady error tone, simply enter the program line again.

HEXADECIMAL OUTPUT

For control of external logic circuitry a four (4) line binary output with strobe provides logic detection of all 16 standard decoded DTMF tone pairs. These outputs are solder pads located on the P.C. Board and are identified as Q4, Q3, Q2, Q1 and STB. All outputs are active "**HIGH**" (5.0VDC) and will drive one TTL load. **REFER TO DECODE TRUTH TABLE** for logic protocol. **NOTE:** See "**TOP SIDE**" of Component Locator on page 5 for location of Q4 - Q1 and STB solder pads.

Functional Decode Truth Table

DETECTED CHARACTERS	FREQ LOW	FREQ HIGH	HEX Q4	HEX Q3	HEX Q2	HEX Q1	STB OUT
1	697	1209	0	0	0	1	1
2	697	1336	0	0	1	0	1
3	697	1477	0	0	1	1	1
4	770	1209	0	1	0	0	1
5	770	1336	0	1	0	1	1
6	770	1477	0	1	1	0	1
7	852	1209	0	1	1	1	1
8	852	1336	1	0	0	0	1
9	852	1477	1	0	0	1	1
0	941	1336	1	0	1	0	1
0	941	1209	1	0	1	1	1
#	941	1477	1	1	0	0	1
A	697	1633	1	1	0	1	1
B	770	1633	1	1	1	0	1
C	852	1633	1	1	1	1	1
D	941	1633	0	0	0	0	1

NOTE:

0 = LOGIC LOW

1 = LOGIC HIGH

REPROGRAMMING OF REMOTE ACCESS CODE (FACTORY OPTION)

Example

To change the factory (optional) pre-programmed remote access code from 789, perform the following.

1. Remote Programming can not be used to change the remote access code.
2. Disconnect power.
3. Remove solder jumper JU4.
4. Connect audio input to DTMF Encoder.
5. Connect either audio or visual outputs as desired for programming acknowledgement.
6. Apply power.
7. Enter * A # and three digit code and wait for confirmation.
8. Remove power and replace solder jumper JU4.

NOTE: The Model NC500 Universal/P.C. programmer can be used to enable and program this feature.

REMOTE PROGRAMMING

(FACTORY OPTION)

Example

To use remote programming to change primary code to 1234, let's assume an access code of 789 and secondary code of 456 have been programmed into the NC401.

1. Key transceiver (transceiver must have a DTMF encoder).
2. Enter 789 * 456 * 1 # 1234 (A 2.5 second timeout is in effect once programming function is started. The remote programming function will terminate if there is a pause exceeding 2.5 seconds.)
3. Wait for transpond acknowledgement. Programming is completed.
4. To program another feature, start again at step 1 and repeat the same procedure using 789 * 456, followed by the address code, timed output or decoded output configuration to be programmed.

OPTIONAL PROGRAMMER

The Model NC500 Universal/P.C. Field Programmer is a small, smartly styled battery powered plastic enclosure with keyboard for service shop or field programming of the Model NC401 DTMF Decoder.

The Model NC500 menu driven software provides all programming data to be input or read from the NC401 and edited on the screen along with a print-out of all data. Software is supplied on 3.5" floppy disk and operates under MS-DOS (version 3.01 or later) on any IBM-PC/XT, AT or Compatible computer. For further details concerning this option, call 1-800-874-8663.

Decoders may be ordered pre-programmed to customers specifications for a charge of \$5.00 per unit.

WARRANTY POLICY

NorComm products are unconditionally guaranteed for two (2) years on materials and labor from date of purchase.

All Warranty repairs must be performed at NorComm's Customer Service Department in Grass Valley, CA. Units under warranty can be returned for repair or replacement without prior authorization, however, a letter explaining the defect should be enclosed with the unit. Out of warranty units returned constitute Purchaser's authorization for NorComm to repair or replace equipment and to invoice Purchaser for any and all reasonable costs of repair labor, parts and freight.

NorComm shall not be obligated to repair or replace equipment rendered defective, in whole or in part, by causes external to the equipment, such as, but not limited to, catastrophe, power failure, or transients, environmental extremes, improper use, and maintenance or interfacing applications. NorComm further assumes no liability for any incidental or consequential damages which may result from the applications of its products by the Purchaser or any other party.

ADDRESS CODES

FUNCTION	FEATURE NUMBER	INDEX NUMBER	ADDRESSING PARAMETERS	SEQUENCE LENGTH
Set Primary 1 Address	1	None	All 16 DTMF Characters	1 - 14
Set Primary 2 Address	B	None	All 16 DTMF Characters	1 - 14
Set Primary 3 Address	C	None	All 16 DTMF Characters	1 - 14
Set Primary 1 Reset Digit	2	None	All 16 DTMF Characters	1
Set Primary 2 Reset Digit	D	1	All 16 DTMF Characters	1
Set Primary 3 Reset Digit	D	2	All 16 DTMF Characters	1
Set Secondary Address	3	None	All 16 DTMF Characters	1 - 14
Set Secondary Reset Digit	4	None	All 16 DTMF Characters	1
Set Group Call & Reset Digits	5	None	All 16 DTMF Characters	2
Set All Call & Reset Digits	6	None	All 16 DTMF Characters	2
Set Remote Access Code (SEE PAGE 7)	A	None	All 16 DTMF Characters	3

NOTE: Both Group Call or All Call digit and reset digit must be programmed as one sequence.

TIMED OUTPUTS

FUNCTION	FEATURE NUMBER	INDEX NUMBER	TIMING PARAMETERS
Alert Tone Output	7	1	1 to 12 Seconds [Note A]
Transpond Tone Output	7	2	1 to 12 Seconds
Momentary Output	7	3	1 to 12 Seconds/Minutes
Primary Timed Reset	7	4	1 to 12 Minutes
Decode Delay	7	5	.2 to 12 Seconds [Note B]
TX Time-out Timer (TOT)	7	6	10 to 120 Seconds
Secondary Timed Reset (User	7	7	1 to 12 Seconds

Select 1 to 9 for 10/100 secs. Or # for 12/120 secs. 0 disables function. [Note A] 0 = Continuous alert tone and [Note B] 0 = 200ms decode delay.

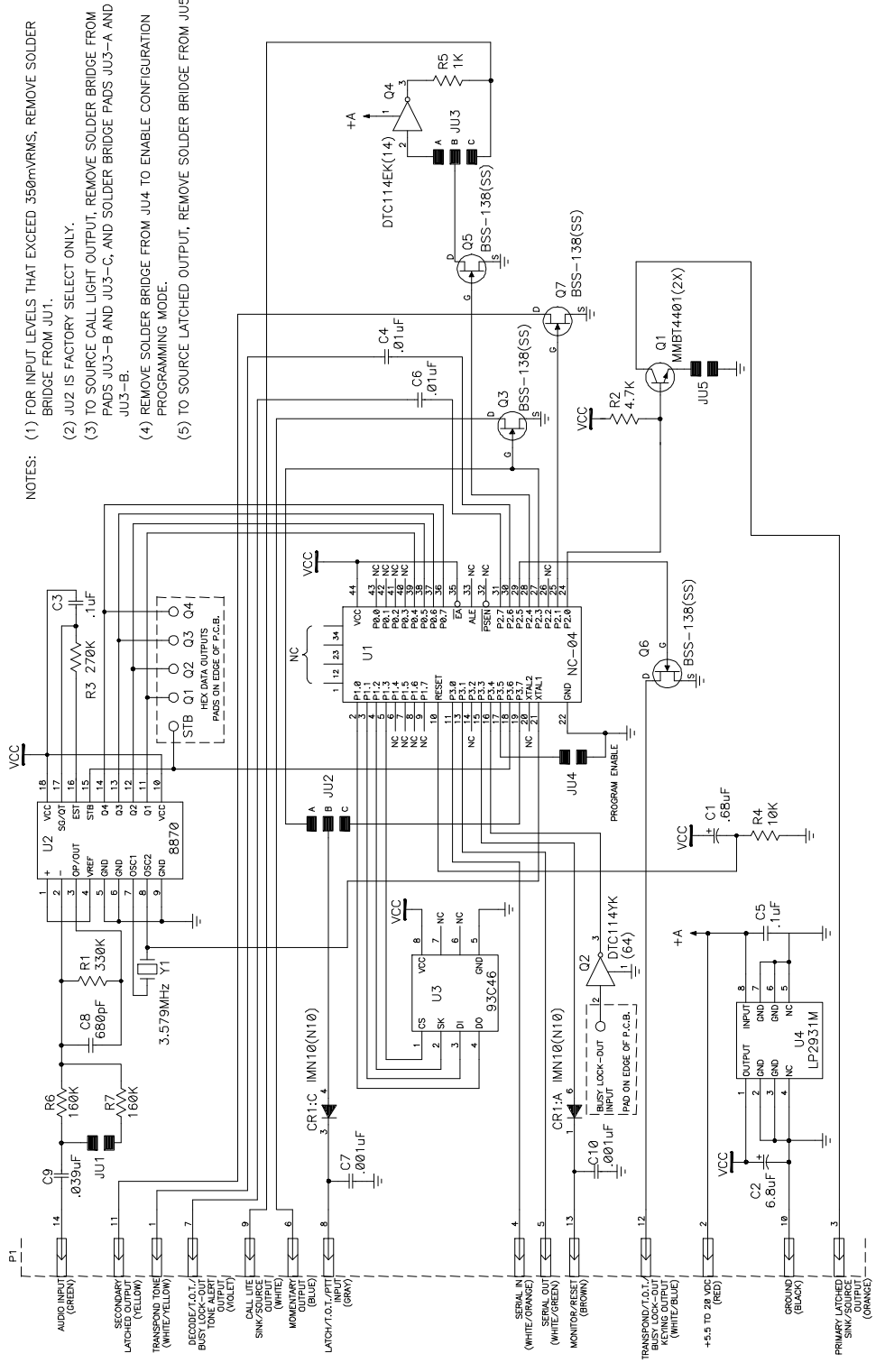
DECODED INPUT/OUTPUT CONFIGURATIONS

FUNCTION	FEATURE NUMBER	INDEX NUMBER	TIMING PARAMETERS
Pri. Latched Output Polarity	8	1	Ø = LOW 1 = HIGH
Call Light Output Select	8	2	Ø = STEADY 1 = PULSE
Momentary Output Select	8	3	Ø = STEADY 1 = PULSE
Momentary Timer Select	8	4	Ø = SECONDS 1 = MINUTES
*Monitor/Reset Input Polarity	8	5	Ø = LOW 1 = HIGH
Busy Lock-out Input Polarity	8	6	Ø = LOW 1 = HIGH
PTT Input Polarity	8	7	Ø = LOW 1 = HIGH
PTT/TX Keying Select	8	9	Ø = FOLLOWING 1 = COMMON
Deadbeat/User Select	9	2	Ø = USER 1 = DEADBEAT
Primary 2 Select	9	3	Ø = GROUP/ALL 1 = PRIMARY
Primary 3 Select	9	4	Ø = GROUP/ALL 1 = PRIMARY
Sec. Latched Output Polarity	9	1	Ø = LOW 1 = HIGH

FACTORY DEFAULT PROGRAMMING

Reset to Factor Defaults	0	00	Enter *0#00
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SCHEMATIC LAYOUT



- NOTES: (1) FOR INPUT LEVELS THAT EXCEED 350mVRMS, REMOVE SOLDER BRIDGE FROM JU1.
 (2) JU2 IS FACTORY SELECT ONLY.
 (3) TO SOURCE CALL LIGHT OUTPUT, REMOVE SOLDER BRIDGE FROM PADS JU3-B AND JU3-C, AND SOLDER BRIDGE PADS JU3-A AND JU3-B.
 (4) REMOVE SOLDER BRIDGE FROM JU4 TO ENABLE CONFIGURATION PROGRAMMING MODE.
 (5) TO SOURCE LATCHED OUTPUT, REMOVE SOLDER BRIDGE FROM JU5.