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MODEL NC105 DIGITAL CODED SQUELCH ENCODER/DECODER INSTRUCTION MANUAL

INTRODUCTION

The Model NC105 is a micro miniature field programmable D.C.S. Encoder/Decoder compatible with Motorola's "Digital Private Line" (DPL), E.F. Johnson's "Digital Call Guard" (DCG) and General Electric's "Digital Channel Guard" (DCG) signaling formats. The Model NC105 is a highly versatile CMOS MICRO-PROCESSOR controlled unit, providing **SIMULTANEOUS** encode and decode, user friendly programming of input and output functions, TX-Time Out Timer, Busy Lock-Out, Default Reset, PTT/TX Common, 16 memory locations, Trans/Rec. Data Polarity, and up to 176 D.C.S. codes plus **NO CODE**. Programming is provided by an on-board miniature Sip switch eliminating the need for solder bridge jumpering of programmed codes or features. All programming is provided with power on and is retained in a nonvolatile E²Prom memory with 40 year data retention and will remain regardless of power interruptions.

GENERAL

The Model NC105 has been designed using surface-mounted technology (SMT) and engineered for maximum reliability. Should you require technical assistance or additional information, please call our customer service department at (530) 477-8400.

SPECIFICATIONS

ENCODER

CODE SELECTION 176 PRE-SET CODES PLUS **NO CODE**
CODE DATA POLARITY NORMAL OR INVERTED
OUTPUT LEVEL 0 TO 850mVRMS
OUTPUT IMPEDANCE >5KΩ, AC COUPLED
OUTPUT DISTORTION <2.0% THD
TURN-OFF CODE..... 134.4Hz SINE WAVE FOR 180ms
TX KEY OUTPUT..... SINKS TO GROUND
PTT INPUT..... ABOVE OR TO GROUND
PTT/TX KEY COMMON OR FOLLOWING

DECODER

CODE SELECTION 176 PRE-SET CODES PLUS **NO CODE**
CODE DATA POLARITY NORMAL OR INVERTED
DECODE DETECT..... 171.1ms (ONE WORD)
DECODE DROP OUT <500ms SIGNAL FADE
DECODE RELEASE <35ms WITH TURN-OFF CODES
DECODE OUTPUT ABOVE OR TO GROUND
INPUT SENSITIVITY..... <10mVRMS
INPUT S/N RATIO <7db SINAD
INPUT IMPEDANCE >60KΩ AC COUPLED

SPECIFICATIONS (cont'd)

SIGNALLING FORMAT23 BIT BINARY CODED WORD.

OPERATING VOLTAGE5.5VDC TO 20VDC

OPERATING CURRENT<10ma

OPERATING TEMPERATURE-30°C TO +70°C

BUSY LOCK-OUT INPUTABOVE OR TO GROUND (+1.5VDC THRESHOLD)

TX TIME-OUT TIMER0 TO 150 sec.

B.L.O./T.O.T. ALERT TONE900/1800 HERTZ TONE, PULSATING AT 125ms

MONITOR INPUTABOVE OR TO GROUND

AUTOMATIC DEFAULTRESETS ALL FEATURES TO FACTORY PRESETS AND CODE TO 023

PROGRAM VERIFICATION "FEATURES" VERIFIED BY AN 1800Hz TONE AND "CODES" BY A 900Hz TONE.
PULSATING TONE INDICATES VALID ENTRY AND STEADY TONE INVALID ENTRY.

PROGRAMMING METHODSFIELD PROGRAMMABLE BY USE OF 10 POSITION SIP SWITCH.

HIGH PASS FILTERTHREE POLE FILTER REMOVES TONE DATA FROM RECEIVER AUDIO.

MEMORY STORAGEPROGRAMMED DATA IS STORED IN NON-VOLATILE E²PROM MEMORY WITH 40
YEAR DATA RETENTION AND WILL REMAIN REGARDLESS OF POWER INTERRUPTIONS. REQUIRES NO
BATTERIES.

16 EXCLUSIVE MEMORIESPROGRAMMED CONFIGURATIONS CAN BE STORED IN UP TO 16 MEMORY LOCATIONS AND ARE
SELECTED BY A 4 LINE BINARY INPUT FOR EXTERNAL ACCESS OF PREPROGRAMMED CODES.

SIMULTANEOUSENCODE OUTPUT IS SEPARATE FROM THE DECODER. THIS FEATURE ALLOWS BOTH ENCODING AND
ENCODE & DECODE DECODING AT THE SAME TIME. **THIS FEATURE IS IDEAL FOR REPEATER APPLICATIONS.**

CODINGINDEPENDENT CODE SELECTION OF ENCODE AND DECODE CAN BE PROGRAMMED.

SINGLE LINE PTTCOMBINES BOTH PTT INPUT AND TX KEYING OUTPUT INTO ONE LINE. THIS METHOD ELIMINATES THE
NEED TO BREAK THE TRANSCEIVERS PTT CIRCUITRY.

TIME BASECRYSTAL CONTROLLED (3.5795MHz)

INTERFACINGMICRO-MINIATURE 14 PIN MOLEX HEADER AND 12" COLOR CODED CABLE ASSEMBLY.

SIZE80" W x 1.60" L x .30" H (.20"H WITH SIP SWITCH REMOVED)
20.15mm W x 40.30mm L x 7.60mm H

MOUNTINGDOUBLE SIDED ADHESIVE TAPE.

THEORY OF OPERATION

Programming the Model NC105 is performed by an on-board 10 position Sip switch. The first eight positions (1-8) are used to program features and D.C.S. codes. The ninth (9th) position when in the "CLOSED" position selects the feature mode and in the "OPEN" position selects the code mode. The tenth (10th) position is used to initiate programmed selections into non-volatile memory.

Upon receipt of a valid D.C.S. code, the decoder will provide an active output for control of receivers squelch circuitry and will reset within 35ms upon receipt of turn-off code or 500ms of signal fade and can be programmed for sink or source, "ABOVE" or "TO" ground configurations. A monitor input function serves to control the decoders' output circuitry when in the non-decoded state by use of the microphone hang-up box or transceivers tone/squelch switch. This input can be programmed for "ABOVE" or "TO" ground sensing. The PTT input enables the encoder and TX keying output. When the PTT input is disabled the TX keying output will remain active for an additional 180ms during which time a 134.4Hz symmetrical tone is generated as a turn-off code to disable the decoder within 35ms, thus eliminating receiver squelch tail. The PTT input also provides for Busy lock-out and Transmit time-out features. When Busy-lock out is selected, the TX keying output will be disabled when receiver is unsquelched and will generate a pulsating 900/1800Hz alert tone for as long as the PTT input is active. If the Time-out feature is selected the TX keying output will be disabled after a preset time of 10 to 150 seconds has elapsed and will generate a pulsating 900/1800Hz alert tone for as long as the PTT input is active. The use of these features requires that the PTT/TX input be programmed as "control following" and requires placing the encoder/decoder in series with the transceivers PTT circuitry. If "COMMON MODE" is selected, then the PTT input and TX keying output are common and require only connecting the PTT input to the transceivers PTT grounding circuitry. Note that in this configuration the Busy lock-out and TX Time-out timer are automatically disabled, but all programming remains in memory.

A four (4) line binary input provides external access to sixteen (16) memory locations. This feature provides memory selection of pre-programmed D.C.S. codes when connected to transceivers channel switch or other selective methods. The default reset feature when activated resets all programmed features to factory presets and D.C.S. code to 023, with the exception of the 16 memory locations. This is most helpful when a pre-programmed feature is unknown.

INSTALLATION NOTES

- 1) If the NC105 D.C.S. unit is to be installed with a system presently using digital coded squelch (D.C.S.), it should first be determined which data polarity is being used. To establish this information refer to the manufacturer's operating manual, or after units have been installed, select data polarity necessary for proper operation.
- 2) The Model NC105 comes complete with factory default programmed features and code 023. A 14 pin micro-miniature color coded cable assembly, along with a piece of double sided adhesive tape has been provided for ease of installation. Remove the protective covering from one side of the tape and apply to bottom surface of P.C. board. Now remove protective covering from remaining side of tape and apply unit to desired location. Although the Model NC105 is engineered for maximum immunity to R.F., it is recommended that all leads be kept to minimum lengths and away from transmitter R.F. circuitry.
- 3) After unit has been installed and programming is completed, the encode deviation must be set. It is important to use a service monitor with a "Deviation Scope" when adjusting the deviation level. Because of the low frequency spectrum used in D.C.S. signaling, the use of a scope is necessary for proper setting of system deviation and will show if any distortion is present with the modulated D.C.S. transmitted signal. The use of a deviation meter for the adjustment is not recommended because deviation level readings may be incorrect.

INTERFACING

- BROWN** DEFAULT PROGRAMMED FOR ACTIVE "HIGH" (OPEN CIRCUIT). IN THIS CONFIGURATION THIS LINE [MONITOR INPUT]..... MUST BE GROUNDED TO ENABLE DECODER. THIS METHOD IS MOST USEFUL IN TODAY'S FRONT-MOUNTED RADIOS WHEN CONNECTED TO CIRCUITRY PROVIDED BY THE HANG-UP BUTTON ON BACK OF MICROPHONE, OR WHEN INSTALLED IN HAND HELD RADIOS THAT PROVIDE A CLOSURE TO GROUND WHEN TONE/SQUELCH SWITCH IS IN THE TONE POSITION. TO REVERSE THIS FUNCTION, PROGRAM INPUT MONITOR "LOW".
- ORANGE** DEFAULT PROGRAMMING FOR ACTIVE "HIGH" (OPEN CIRCUIT). THIS OUTPUT IS AN OPEN COLLECTOR [DECODE OUTPUT] TRANSISTOR, AND IN THIS CONFIGURATION REMOVES THE OUTPUT FROM GROUND UPON DECODE. TO REVERSE THIS FUNCTION, PROGRAM OUTPUT FOR DECODE "LOW". TO SOURCE THIS OUTPUT REMOVE SOLDER BRIDGE JUMPER FROM PADS JU3, (SEE P.C. BOARD LAYOUT FOR LOCATION OF JU3). **NOTE:** SOURCED OUTPUT IS 5VDC IN SERIES WITH A 5.6KΩ RESISTOR AND STEERING DIODE.
- RED** CONNECT TO +5.5VDC TO 20VDC. (+) [SUPPLY]
- BLACK** CONNECTS TO SYSTEM GROUND. [SYSTEM GROUND]
- BLUE** DEFAULT PROGRAMMED FOR ACTIVE "HIGH" (+1.5VDC). [BUSY LOCK-OUT INPUT] CONNECT TO RECEIVERS SQUELCH CIRCUITRY THAT PROVIDES A Ø TO A MINIMUM OF +1.5VDC WHEN RECEIVER IS UNSQUELCHED. TO REVERSE THIS FUNCTION, PROGRAM INPUT FOR BUSY LOCK-OUT "LOW". **NOTE:** IF PROGRAMMED "LOW", THIS INPUT MUST TRANSITION FROM A MINIMUM OF +1.5VDC TO GROUND.
- VIOLET** CONNECT TO RECEIVERS AUDIO OUTPUT CIRCUITRY **NOT** CONTROLLED BY VOLUME OR SQUELCH [B.L.O./T.O.T. ALERT & PROG. VERIFYTONE OUTPUTS] CIRCUITRY. THIS WILL PREVENT MUTING OR ATTENUATION OF TONES. THIS OUTPUT IS A.C. COUPLED, BUT MAY REQUIRE A SERIES RESISTOR TO PROVIDE LEVEL CONTROL AND PREVENT LOADING OF RECEIVERS AUDIO CIRCUITRY.

GREEN
[DECODE AUDIO INPUT]

DEFAULT PROGRAMMED FOR "**NORMAL**" DATA POLARITY. CONNECT **DIRECT** TO RECEIVERS DISCRIMINATOR OUTPUT CIRCUITRY. TO "**INVERT**" DATA INPUT, PROGRAM DATA POLARITY FOR INVERT.

WHITE
[H.P.F. OUTPUT]

IF THE HIGH PASS FILTER IS REQUIRED, BREAK AUDIO CIRCUITRY AT OUTPUT OF RECEIVER-DISCRIMINATOR AND CONNECT GREEN DECODE LEAD TO OUTPUT OF DISCRIMINATOR AND WHITE H.P.F. OUTPUT LEAD TO REMAINING SIDE OF BROKEN AUDIO PATH. **NOTE:** SOLDER BRIDGE JUMPER PADS JU1, (SEE P.C. BOARD LAYOUT FOR LOCATION OF JU1).

BLACK/WHITE
[H.P.F. INPUT]

FOR RECEIVERS WITH AUDIO CIRCUITRY REQUIRING THE USE OF A SEPARATE HIGH PASS FILTER, REMOVE SOLDER BRIDGE JUMPER FROM PADS JU1 AND USE THE H.P.F. (**BLACK/WHITE**) LEAD FOR FILTER INPUT AND THE H.P.F. (**WHITE**) LEAD FOR FILTER OUTPUT. THIS METHOD PROVIDES AN INDEPENDENT HIGH PASS FILTER CIRCUIT FOR APPLICATIONS OTHER THAN IN SERIES WITH DISCRIMINATOR OUTPUT. **NOTE:** DO NOT CONNECT FILTER TO HIGH LEVEL AUDIO STAGES, SUCH AS SPEAKER OUTPUT.

YELLOW
[ENCODE AUDIO OUTPUT]

DEFAULT PROGRAMMED FOR "**NORMAL**" DATA POLARITY. CONNECT TO VARACTOR DIODE OF CRYSTAL OSCILLATOR OR TRANSMITTERS FM MODULATOR INPUT. A SERIES RESISTOR MAY BE REQUIRED TO PREVENT LOADING OF OSCILLATOR CIRCUITRY. ADJUST R6 FOR $\pm 750\text{Hz}$ OF DEVIATION. TO "**INVERT**" DATA OUTPUT, PROGRAM DATA POLARITY FOR INVERT. **NOTE:** FOR INSTALLATION INTO P.M. OR P.L.L. SYNTHESIZED TYPE MODULATORS CONTACT NORCOMM'S CUSTOMER SERVICE DEPT. @ (530) 477-8400.

GRAY
[B.L.O./T.O.T. & ENCODE
ENABLE INPUTS]

DEFAULT PROGRAMMED FOR ACTIVE "**LOW**" (TO GROUND) AND "**FOLLOWING**" MODE. IN THIS CONFIGURATION, GROUNDING THIS LINE WILL ENABLE THE ENCODER, AND IF SELECTED, THE TX TIME-OUT TIMER AND BUSY LOCK-OUT FEATURES. THIS METHOD REQUIRES BREAKING THE PTT LOW CIRCUITRY AT THE PTT SWITCH, CONNECTING THE GRAY LEAD TO THE PTT SWITCH AND THE WHITE/BLUE LEAD TO REMAINING SIDE OF BROKEN PTT CIRCUITRY. TO REVERSE THIS FUNCTION, PROGRAM INPUT FOR PTT "**HIGH**". **NOTE:** IF PROGRAMMED "**HIGH**", THIS INPUT MUST TRANSITION FROM A MINIMUM OF +5VDC TO GROUND.

IF DESIRED, A SINGLE CONNECTION CAN BE MADE TO THE PTT SWITCH, ELIMINATING THE NEED TO BREAK THE PTT CIRCUITRY. TO USE THIS CONFIGURATION, PROGRAM PTT INPUT FOR "**COMMON**" MODE. SOLDER BRIDGE JUMPER PADS JU2 AND CONNECT (**GRAY**) LEAD ONLY TO THE PTT GROUND SWITCH. USING THIS METHOD AUTOMATICALLY DISABLES THE TX TIME-OUT TIME AND BUSY LOCK-OUT FEATURES, BUT ALL PROGRAMMING REMAINS IN MEMORY.

WHITE/BLUE
[B.L.O./T.O.T. &
TX KEYING OUTPUT]

THIS OUTPUT IS AN OPEN COLLECTOR TRANSISTOR AND WILL SINK TO GROUND 80mA @ 40VDC.

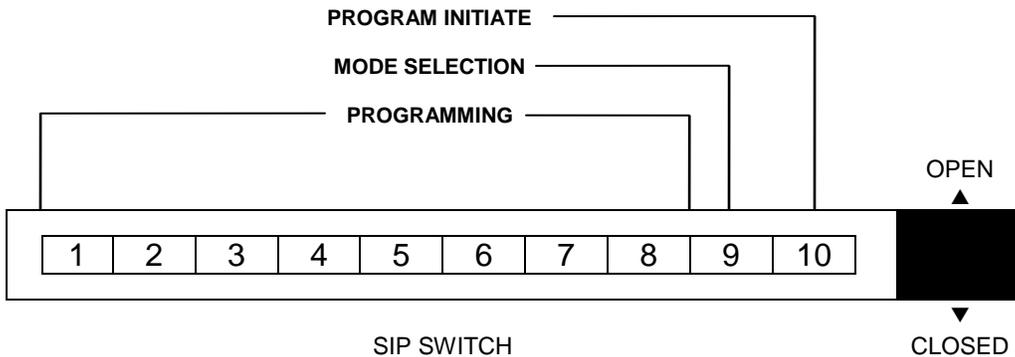
PROGRAMMING INSTRUCTIONS

The Model NC105 is field programmable via an on-board miniature ten (10) position Sip switch. There are two (2) programming modes; feature and code. Both of these will be discussed separately. In order to program the NC105, power must be applied and it is recommended that the (**violet**) lead be connected as described in the installation section for audible verification of programmed features and codes. The NC105 is supplied with factory default [**D**] parameters.

CUSTOMER _____ RADIO MAKE _____ RADIO MODEL _____
SERIAL NUMBER _____ ADDRESS CODE _____ DATE _____

SIP SWITCH PROGRAMMING ILLUSTRATION

NOTES: [**D**] = FACTORY DEFAULT [**INT**] = PROGRAM INITIATE



FEATURE PROGRAMMING SEQUENCE

- [1] Set program switches to desired feature. (See feature selection)
- [2] Note your feature(s) selected under "**SET TO**" for future reference.
- [3] Set Sip switch (9) to "**FEATURE**" mode. [**CLOSED**]
- [4] Set "**INITIATOR**" Sip switch (10) to [**CLOSED**] position and wait for a pulsating 1800Hz tone. NOTE: A steady 1800Hz tone indicates an invalid entry. Check for valid selection.
- [5] Set "**INITIATOR**" Sip switch (10) to [**OPEN**] position to turn off verification tone. Feature is now programmed into memory.
- [6] Repeat steps 1 through 5 when changing or selecting additional features.

FEATURE SELECTION

DECODE DATA:

| SET TO | POLARITY | SIP SWITCH | | | | | | | | | |
|--------|------------|------------|------|------|--------|------|------|------|--------|--------|-----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | NORMAL [D] | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | INVERTED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

[D] = FACTORY DEFAULT

[INT] = PROGRAM INITIATION

ENCODE DATA:

| SET TO | POLARITY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|------------|--------|------|------|------|------|------|------|--------|--------|-----|
| | NORMAL [D] | CLOSED | OPEN | CLOSED | INT |
| | INVERTED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

MONITOR INPUT: [ACTIVE STATE]

| SET TO | POLARITY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|----------|------|--------|--------|------|------|------|------|--------|--------|-----|
| | HIGH [D] | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | LOW | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

DECODE OUTPUT: [ACTIVE STATE]

| SET TO | POLARITY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|----------|------|--------|--------|--------|------|------|------|--------|--------|-----|
| | HI-Z [D] | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | LOW | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

PTT INPUT: [ACTIVE STATE]

| SET TO | POLARITY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|----------|------|--------|------|--------|------|------|------|--------|--------|-----|
| | LOW [D] | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | HIGH | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

FEATURE SELECTION CONTINUED

| | | | | | | | | | | | |
|---------|------------|--|--|--|--|--|--|--|--|--|--|
| PTT/TX: | SIP SWITCH | | | | | | | | | | |
|---------|------------|--|--|--|--|--|--|--|--|--|--|

| SET TO | POLARITY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|------------|--------|------|--------|------|------|------|------|--------|--------|-----|
| | FOLLOW [D] | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | COMMON | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

NOTES: If PTT/TX mode is programmed for "**COMMON**" mode, it will automatically set the default states of the following features: "TRANSMIT TIME-OUT TIMER" to disabled, "BUSY LOCK-OUT INPUT" to disabled and "PTT INPUT POLARITY" to active **LOW**. In this mode these features are locked-out and cannot be programmed. Any attempt will generate the invalid program tone.

If PTT/TX mode is reprogrammed to "**FOLLOW**" mode, it will reset the default states of the following features: "TRANSMIT TIME-OUT TIMER" to user preprogrammed time and "BUSY LOCK-OUT" input to enable.

FACTORY DEFAULT:

| SET TO | MODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|---------|------|------|------|------|------|------|------|------|--------|-----|
| | DEFAULT | OPEN | CLOSED | INT |

NOTE: This function is useful if programmed configurations are unknown. Activating this mode will reset all features to factory defaults and D.C.S. code to 023.

ENCODING METHOD:

| SET TO | MODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|-------------|------|------|------|--------|------|------|------|--------|--------|-----|
| | PTT [D] | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | UPON DECODE | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

NOTE: Mode selection of "**UPON DECODE**" provides encode output data upon a valid decode. This feature is ideal when used for repeater application requiring simultaneous encoding and decoding.

BUSY LOCK-OUT: [ACTIVE STATE]

| SET TO | POLARITY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|----------|------|--------|------|------|------|------|------|--------|--------|-----|
| | HIGH [D] | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | LOW | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |

FEATURE SELECTION CONTINUED

| TIME-OUT TIMER: | | SIP SWITCH | | | | | | | | | |
|-----------------|---------|------------|------|--------|------|--------|--------|--------|--------|--------|-----|
| SET TO | SECONDS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 0 [D] | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | INT |
| | 10 | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | INT |
| | 20 | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | CLOSED | INT |
| | 30 | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | CLOSED | INT |
| | 40 | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | INT |
| | 50 | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | INT |
| | 60 | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | CLOSED | INT |
| | 70 | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | INT |
| | 80 | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | INT |
| | 90 | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | INT |
| | 100 | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | INT |
| | 110 | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | INT |
| | 120 | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | INT |
| | 130 | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | INT |
| | 140 | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | INT |
| | 150 | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | INT |

CODED PROGRAMMING SEQUENCE

- [1] Set program Sip switches to desired D.C.S. code. (See code selection)
- [2] Note code selected under "**MEMORY**" for future reference. (See memory selection, Page 15)
- [3] Set Sip switch (9) to "**CODE**" mode. [**OPEN**]
- [4] Set "**INITIATOR**" Sip switch (10) to [**CLOSED**] position and wait for a pulsating 900Hz tone. **NOTE:** A steady 900Hz tone indicates an invalid entry. Check for valid selection.
- [5] Set "**INITIATOR**" Sip switch (10) to [**OPEN**] position to turn off verification tone. Code is now programmed into memory.

CODED SELECTION

NOTE:

To select an encoder code different than the decoder, perform the following:

- 1) Connect PTT Input lead [GRAY] to **GROUND** and perform **CODE PROGRAMMING SEQUENCE** steps [1] through [5].
- 2) Remove PTT Input lead from **GROUND**.

| EN/DEC CODE: | | SIP SWITCH | | | | | | | | | |
|--------------|------|------------|--------|--------|--------|--------|--------|--------|--------|------|-----|
| MEMORY | CODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 002 | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 003 | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 004 | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 005 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 006 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 007 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 010 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 011 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 012 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 013 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 014 | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 015 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 016 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 017 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 020 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 021 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 022 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 023 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 024 | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 025 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 026 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 027 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 030 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 031 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 032 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 034 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 035 | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 036 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |

CODED SELECTION CONTINUED

| EN/DEC CODE: | | SIP SWITCH | | | | | | | | | |
|--------------|------|------------|--------|--------|--------|--------|--------|--------|--------|------|-----|
| MEMORY | CODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 040 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 041 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 042 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 043 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 045 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 047 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 050 | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 051 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 053 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 054 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 061 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 062 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 064 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 065 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 071 | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 072 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 073 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 074 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 077 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 102 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 105 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 106 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 110 | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 112 | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 113 | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 114 | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 115 | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 116 | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 122 | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 125 | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 131 | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 132 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |

CODED SELECTION CONTINUED

| EN/DEC CODE: | | SIP SWITCH | | | | | | | | | |
|--------------|------|------------|------|--------|--------|--------|--------|--------|--------|------|-----|
| MEMORY | CODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 134 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 141 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 143 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 145 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 146 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 152 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 155 | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 156 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 162 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 165 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 166 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 172 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 174 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 175 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 205 | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 212 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 214 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 223 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 225 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 226 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 243 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 244 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 245 | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 246 | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 251 | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 252 | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 255 | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 257 | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 261 | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 263 | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 265 | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 266 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |

CODED SELECTION CONTINUED

| MEMORY | CODE | SIP SWITCH | | | | | | | | | |
|--------------|------|------------|--------|--------|--------|--------|--------|--------|--------|------|-----|
| EN/DEC CODE: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 271 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 272 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 274 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 275 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 306 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 311 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 315 | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 325 | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 331 | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 332 | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 335 | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 336 | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 337 | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 343 | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 346 | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 347 | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 351 | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 356 | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 357 | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 361 | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 364 | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 365 | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 367 | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 371 | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 376 | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 411 | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 412 | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 413 | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 423 | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 431 | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 432 | CLOSED | OPEN | OPEN | INT |
| | 445 | OPEN | CLOSED | OPEN | INT |

CODED SELECTION CONTINUED

| EN/DEC CODE: | SIP SWITCH | | | | | | | | | | |
|--------------|------------|------|--------|--------|--------|--------|--------|--------|--------|------|-----|
| MEMORY | CODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 446 | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 452 | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 454 | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 455 | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 462 | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 463 | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 464 | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 465 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 466 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 503 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 506 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 516 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 523 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 526 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 527 | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 532 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 537 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 546 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 547 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 555 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 556 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 565 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 576 | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 577 | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 606 | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 612 | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 624 | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 627 | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 631 | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 632 | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 633 | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 644 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |

CODED SELECTION CONTINUED

| EN/DEC CODE: | | SIP SWITCH | | | | | | | | | |
|--------------|------|------------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| MEMORY | CODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | 646 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 651 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 654 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| | 662 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 664 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | OPEN | INT |
| | 703 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | CLOSED | OPEN | INT |
| | 712 | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | OPEN | INT |
| | 716 | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 723 | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 731 | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 732 | OPEN | CLOSED | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | INT |
| | 733 | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | INT |
| | 734 | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | CLOSED | OPEN | OPEN | INT |
| | 743 | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | CLOSED | OPEN | INT |
| | 752 | OPEN | CLOSED | OPEN | CLOSED | OPEN | OPEN | OPEN | OPEN | OPEN | INT |
| | 753 | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | CLOSED | OPEN | INT |
| | 754 | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | CLOSED | OPEN | OPEN | INT |
| | 767 | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | CLOSED | OPEN | INT |
| | 777 | OPEN | CLOSED | OPEN | OPEN | CLOSED | CLOSED | OPEN | OPEN | OPEN | INT |
| NO CODE | | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | CLOSED | INT |

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.

--SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE--

MEMORY SELECTION

A four line binary input provides up to 16 memory locations for external selection of programmed codes. These inputs are located on the top side of the P.C. Board and are small solder pads for connection of external wires. Up to five memories can be selected without the use of a diode matrix. These are active inputs, which means that the state of these inputs determines which memory location is to be programmed to or selected from. A **LOW** (To Ground) on one or more of the four inputs opens 1 of the 16 available memories. **NOTE: ALL INPUTS UNGROUNDED AUTOMATICALLY SELECT MEMORY 1.**

[1] Perform steps [1] through [3] as described in "**CODE PROGRAMMING SEQUENCE**".

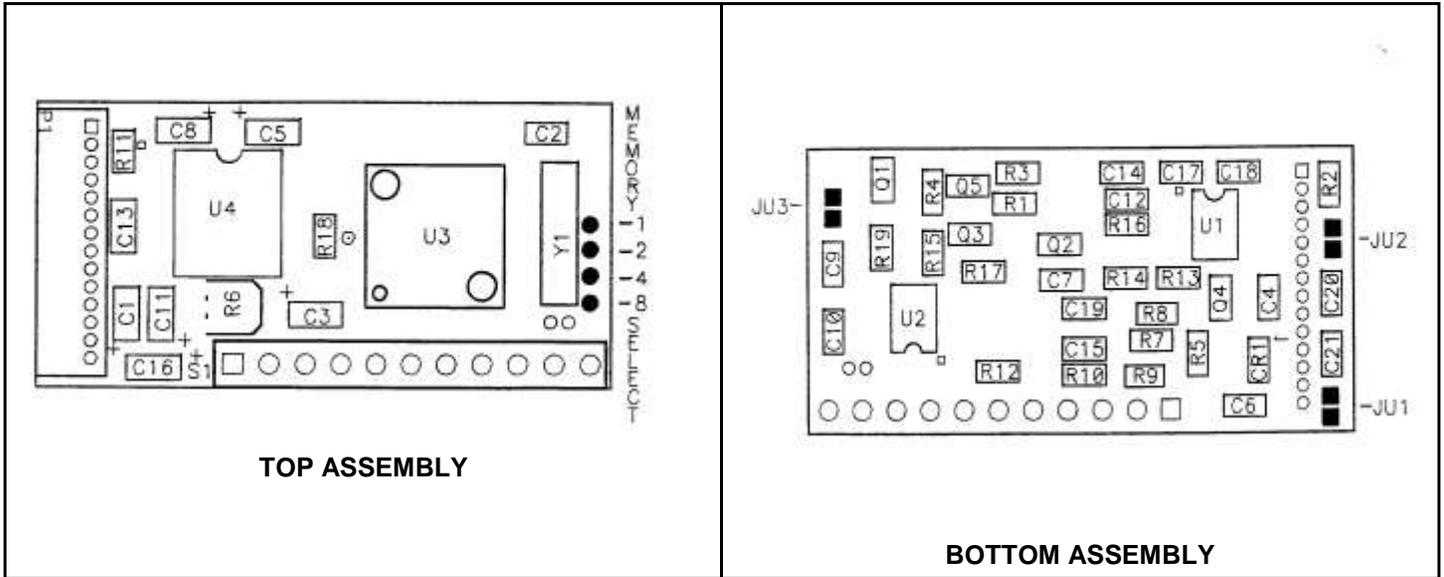
[2] Select desired memory location by grounding appropriate binary inputs. (See binary selection)

[3] Perform steps [4] through [5] as described in "**CODE PROGRAMMING SEQUENCE**".

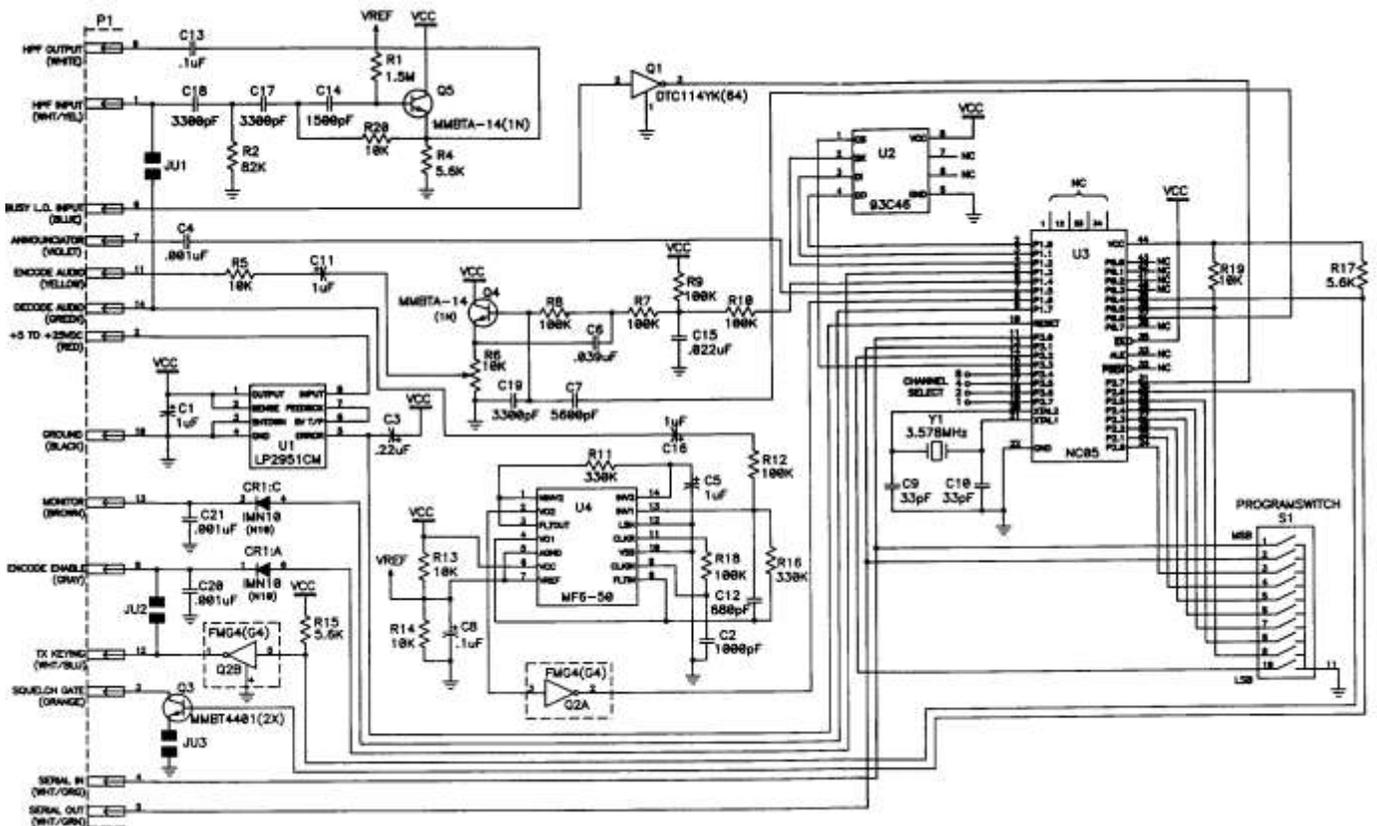
| MEMORY | ENC. | DEC. | 1 | 2 | 4 | 8 |
|--------|------|------|---|---|---|---|
| 1 | | | 1 | 1 | 1 | 1 |
| 2 | | | 0 | 1 | 1 | 1 |
| 3 | | | 1 | 0 | 1 | 1 |
| 4 | | | 0 | 0 | 1 | 1 |
| 5 | | | 1 | 1 | 0 | 1 |
| 6 | | | 0 | 1 | 0 | 1 |
| 7 | | | 1 | 0 | 0 | 1 |
| 8 | | | 0 | 0 | 0 | 1 |
| 9 | | | 1 | 1 | 1 | 0 |
| 10 | | | 0 | 1 | 1 | 0 |
| 11 | | | 1 | 0 | 1 | 0 |
| 12 | | | 0 | 0 | 1 | 0 |
| 13 | | | 1 | 1 | 0 | 0 |
| 14 | | | 0 | 1 | 0 | 0 |
| 15 | | | 1 | 0 | 0 | 0 |
| 16 | | | 0 | 0 | 0 | 0 |

NOTE:
 1 = Open (High)
 0 = To Ground (Low)

COMPONENT LAYOUT



SCHEMATIC LAYOUT



DCS UNIQUE AND DUPLICATE CODES - NORMAL AND INVERTED

| NORMAL CODES | DUPLICATE CODES | INVERTED CODES | NORMAL CODES | DUPLICATE CODES | INVERTED CODES | NORMAL CODES | DUPLICATE CODES | INVERTED CODES |
|--------------|-----------------|-----------------|--------------|-----------------|-----------------|--------------|-----------------|-------------------------|
| 000 | 352 | 257 705 | 105 | 204 247 420 710 | 335 | 254 | 314 612 706 | 346 616 635 724 |
| 001 | 476 760 | 077 | 106 | 221 241 304 424 | 733 | 255 | 425 | 446 467 511 672 |
| 002 | 522 540 | 777 | 107 | 365 | 125 173 | 257 | 705 | 000 352 |
| 003 | 100 | 113 573 | 110 | 126 302 430 | 752 755 | 262 | 316 431 730 | 235 611 671 723 |
| 004 | 300 334 | 347 434 776 | 112 | 250 505 512 | | 266 | 655 | 454 513 545 564 |
| 005 | 044 400 | 175 | 113 | 573 | 003 100 | 271 | 427 510 762 | 065 301 |
| 006 | | 021 277 402 | 114 | 327 615 | 136 502 712 | 272 | | 027 201 242 |
| 007 | 670 | 214 310 377 437 | 115 | 534 674 | 152 366 415 | 274 | 652 | 145 525 |
| 010 | 033 600 | 463 637 775 | 117 | 411 756 | 104 226 557 | 275 | | 035 124 403 |
| 011 | 401 531 625 | 651 677 | 122 | 535 | 225 5356 | 276 | 326 432 | 067 516 720 |
| 012 | 215 320 | 577 | 123 | 632 657 | 075 501 624 | 307 | 362 565 | 150 256 703 |
| 013 | 063 700 | 376 617 763 | 125 | 173 | 107 365 | 311 | 330 456 561 | 344 471 664 715 |
| 014 | 450 500 544 | 646 665 | 127 | 412 441 711 | 143 333 | 312 | 515 663 743 | 163 460 607 654 |
| 015 | 740 747 | 141 177 541 | 130 | 364 641 | 131 572 702 | 315 | 321 673 | 234 423 563 621 713 |
| 016 | 154 206 | 357 477 774 | 131 | 572 702 | 130 364 641 | 317 | 546 614 751 | 132 605 634 714 |
| 017 | 200 | 050 167 | 132 | 605 634 714 | 317 546 614 751 | 324 | 343 570 | 161 345 532 |
| 020 | 170 230 601 | 166 773 | 133 | 413 620 | 054 405 675 | 325 | 550 626 | 526 562 645 |
| 021 | 277 402 | 006 | 134 | 273 | 223 350 475 750 | 331 | 372 507 | 056 465 656 |
| 022 | 264 461 613 | 576 722 | 135 | 205 610 | 213 263 736 | 332 | 433 552 | 455 533 551 |
| 023 | 340 766 | 047 375 707 | 136 | 502 712 | 114 327 615 | 335 | | 105 204 247 420 710 |
| 024 | 120 260 | 753 | 141 | 177 541 | 015 740 747 | 336 | 770 | 034 103 140 410 |
| 025 | | 176 244 417 | 142 | 174 270 | 074 360 721 | 337 | | 040 052 404 |
| 026 | 566 | 237 464 642 772 | 143 | 333 | 127 412 441 711 | 344 | 471 664 715 | 311 330 456 561 |
| 027 | 201 242 | 272 | 144 | 466 666 | 363 436 443 444 | 346 | 616 635 724 | 254 314 612 706 |
| 030 | 055 | 527 764 | 145 | 525 | 662 | 347 | 434 776 | 004 300 334 |
| 031 | 374 643 | 037 560 627 | 146 | 220 414 422 442 | 274 652 | 351 | 353 435 | 243 267 342 |
| 032 | | 051 520 771 | 147 | 622 | 633 667 | 356 | 521 | 212 253 |
| 034 | 103 140 410 | 336 770 | 150 | 303 306 761 | 071 603 717 746 | 357 | 477 774 | 016 154 206 |
| 035 | 124 403 | 275 | 152 | 256 703 | 307 362 565 | 361 | 373 | 042 160 216 341 |
| 036 | 137 | 057 172 | 153 | 366 415 | 115 534 674 | 363 | 436 443 444 662 | 144 466 666 |
| 037 | 560 627 | 031 374 643 | 155 | 606 630 | 231 504 631 636 | 367 | 676 | 062 070 101 407 |
| 040 | 052 404 | 337 | 156 | 233 660 | 745 | 376 | 617 763 | 013 063 700 |
| 041 | 111 451 514 602 | 767 | 157 | 517 741 | 447 473 474 731 | 446 | 467 511 672 | 255 425 |
| 042 | 160 216 341 | 361 373 | 161 | 322 503 | 744 | 447 | 473 474 731 744 | 155 233 660 |
| 043 | 355 | 222 445 457 575 | 162 | 345 532 | 171 265 426 | 452 | 524 765 | 053 |
| 045 | 240 305 543 | 716 727 | 163 | 416 553 | 162 416 553 | 454 | 513 545 564 | 266 655 |
| 046 | 202 210 421 644 | 556 | 164 | 460 607 654 | 324 343 570 | 455 | 533 551 | 332 433 552 |
| 047 | 375 707 | 023 340 766 | 165 | 207 732 | 157 322 503 | 462 | 472 623 725 | 252 661 |
| 050 | 167 | 017 200 | 166 | 354 | 312 515 663 743 | 463 | 637 775 | 010 033 600 |
| 051 | 520 771 | 032 | 171 | 773 | 227 261 567 | 523 | 647 726 | 246 542 653 |
| 053 | | 452 524 765 | 175 | 265 426 | 236 251 704 742 | 526 | 562 645 | 325 550 626 |
| 054 | 405 675 | 133 413 620 | 176 | | 020 170 230 601 | 527 | 764 | 030 055 |
| 056 | 465 656 | 331 372 507 | 212 | 244 417 | 156 517 741 | 537 | 735 | 061 211 232 650 |
| 057 | 172 | 036 137 | 213 | 253 | 005 044 400 | 547 | 757 | 102 121 323 604 |
| 060 | 116 737 | 076 203 754 | 214 | 263 736 | 025 | 555 | 571 | 064 151 406 440 |
| 061 | 211 232 650 | 537 735 | 217 | 310 377 437 | 356 521 | 556 | | 046 202 210 421 644 |
| 062 | 070 101 407 | 367 676 | 222 | 371 453 530 | 135 205 610 | 576 | 722 | 022 264 461 613 |
| 064 | 151 406 440 | 555 571 | 223 | 445 457 575 | 007 670 | 577 | | 012 215 320 |
| 065 | 301 | 271 427 510 762 | 224 | 350 475 750 | 066 734 | 633 | 667 | 146 220 414 422 442 622 |
| 066 | 734 | 217 371 453 530 | 225 | 313 506 574 | 043 355 | 646 | 665 | 014 450 500 544 |
| 067 | 516 720 | 276 326 432 | 227 | 536 | 134 273 | 651 | 677 | 011 401 531 625 |
| 071 | 603 717 746 | 147 303 306 761 | 231 | 261 567 | 073 640 | 716 | 727 | 045 240 305 543 |
| 072 | 470 701 | 245 370 554 | 234 | 504 631 636 745 | 122 535 | 733 | | 106 221 241 304 424 |
| 073 | 640 | 224 313 506 574 | 235 | 423 563 621 713 | 164 207 732 | 752 | 755 | 110 126 302 430 |
| 074 | 360 721 | 142 174 270 | 236 | 611 671 723 | 153 606 630 | 753 | | 024 120 260 |
| 075 | 501 624 | 123 632 657 | 237 | 251 704 742 | 315 321 673 | 767 | | 041 111 451 514 602 |
| 076 | 203 754 | 060 116 737 | 243 | 464 642 772 | 262 316 431 730 | 777 | | 002 522 540 |
| 077 | | 001 476 760 | 245 | 267 342 | 165 354 | | | |
| 102 | 121 323 604 | 547 757 | 246 | 370 554 | 026 566 | | | |
| 104 | 226 557 | 117 411 756 | 252 | 542 653 | 351 353 435 | | | |
| | | | | 661 | 072 470 701 | | | |
| | | | | | 523 647 726 | | | |
| | | | | | 462 472 623 725 | | | |