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# MODEL NC113 DIGITAL CODED SQUELCH ENCODER/DECODER REPEATER MODULE INSTRUCTION MANUAL

## INTRODUCTION

The Model NC113 is a field programmable D.C.S. Encoder/Decoder, engineered with dual low pass filters for simultaneously encoding and decoding up to 176 pre-programmed D.C.S. codes. The NC113 is a single P.C. Board designed for direct plug-in compatibility with Relm's Models U-10R, WH-100R, WU-451R, and earlier Models U-10 and U-14 series repeaters. The NC113 is compatible with Motorola's (DPL) and General Electric's (D.C.G.) signalling formats. Programming is provided by an on board sip switch or optional Model NC500 P.C. Programmer eliminating the need for solder bridge jumpering of codes or features.

## SPECIFICATIONS

<u>ENCODER</u>	<u>DECODER</u>
CODE SELECTION . . . . . 176 PRE-SET CODES	CODE SELECTION . . . . . 176 PRE-SET CODES
CODE DATA POLARITY . . . . . NORMAL OR INVERTED	CODE DATA POLARITY . . . . . NORMAL OR INVERTED
OUTPUT LEVEL . . . . . 0 TO 850mVRMS	DECODE DETECT . . . . . 171.1ms (ONE WORD)
OUTPUT DISTORTION . . . . . <2.0% THD	DECODE DROP OUT . . . . . <500ms SIGNAL FADE
TURN-OFF CODE . . . . . 134.4Hz SINE WAVE FOR 180ms	DECODE RELEASE . . . . . <50ms WITH TURN-OFF CODES

## GENERAL

SIGNALLING FORMAT . . . . .	23 BIT BINARY CODED WORD
OPERATING VOLTAGE . . . . .	5.5VDC TO 20VDC
OPERATING CURRENT . . . . .	<10ma
OPERATING TEMPERATURE . . . . .	-30°C TO +70°C
AUTOMATIC DEFAULT . . . . .	RESETS 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 METHODS . . . . .	FIELD PROGRAMMABLE BY USE OF 10 POSITION SIP SWITCH.
HIGH PASS FILTER . . . . .	THREE POLE FILTER REMOVES TONE DATA FROM RECEIVER AUDIO.
MEMORY STORAGE . . . . .	PROGRAMMED DATA IS STORED IN NON-VOLATILE E <sup>2</sup> PROMMEMORY AND WILL REMAIN REGARDLESS OF POWER INTERRUPTIONS.
TIME BASE . . . . .	CRYSTAL CONTROLLED (3.5795MHz)
INTERFACING . . . . .	12 PIN MOLEX EDGE CONNECTOR
SIZE . . . . .	1.48" W x 3.00" L x .50" H 37.28mm W x 75.56mm L x 12.59mm H
MOUNTING . . . . .	DIRECT PLUG-IN

# THEORY OF OPERATION

Programming the Model NC113 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, indicated by the red LED, the decoder will enable the encoder and provide an active output for control of repeaters interface circuitry and will release within 35ms upon receipt of turn-off code or 500ms of signal fade. The PTT switch serves to manually enable the encoder and output control circuitry, indicated by the green LED, when activated. When the PTT switch is disabled (released), the output control circuitry will remain active for an additional 180ms during which time a 134.4Hz symmetrical tone is generated as a turn-off code.

The default reset feature when activated resets all programmed features to factory presets and D.C.S. code to "023". This is most helpful when a pre-programmed feature is unknown.

## INSTALLATION

- 1) Plug NC113 into desired slot on tone panel.
- 2) Install a 56K ohm resistor **DIRECTLY** to the junction of CR301A and R301A located in transmitters crystal oscillator circuitry. Connect **YELLOW** lead from NC113 Tone Unit to other end of the 56K ohm resistor.
- 3) Set system deviation to  $\pm 4.5K$ .
- 4) Activate Local PTT Circuitry via microphone push button and encode push switch, located on NC113 Tone Unit, simultaneously. Adjust R9, located on Tone Unit, for  $\pm 800$  hertz deviation.

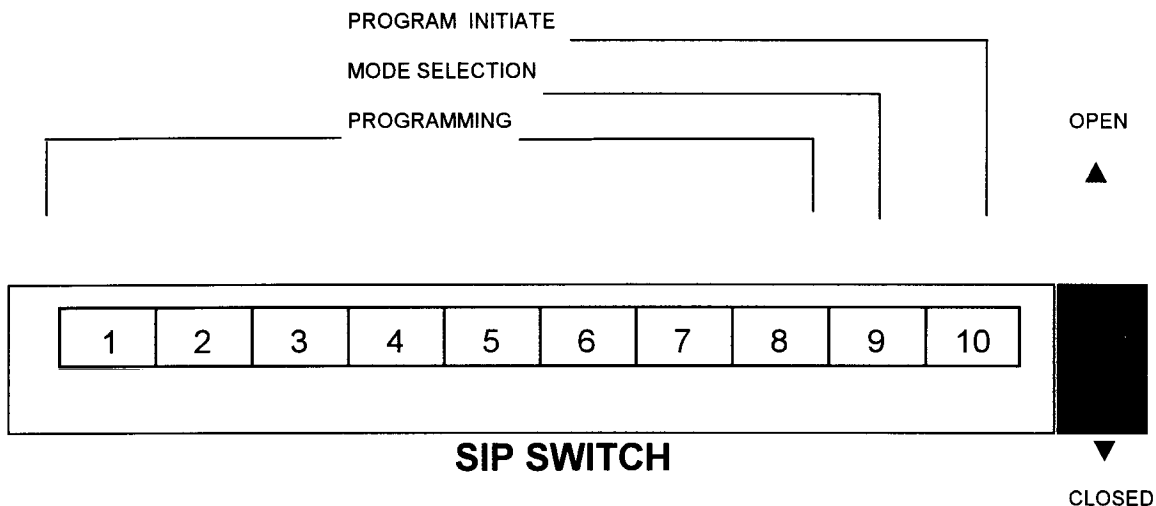
## PROGRAMMING INSTRUCTIONS

The Model NC113 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 NC113, power must be applied. The Model NC113 is supplied with factory default parameters for direct plug-in compatibility.

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:

SIP SWITCH

SET TO	POLARITY	1	2	3	4	5	6	7	8	9	10
	<b>NORMAL [D]</b>	CLOSED	OPEN	OPEN	CLOSED	OPEN	OPEN	OPEN	OPEN	CLOSED	INT
	<b>INVERTED</b>	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
	<b>NORMAL [D]</b>	CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	INT
	<b>INVERTED</b>	CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	INT

### FACTORY DEFAULT:

SET TO	MODE	1	2	3	4	5	6	7	8	9	10
	<b>DEFAULT</b>	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	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".

## CODED PROGRAMMING SEQUENCE

- [1] Set program Sip switches to desired D.C.S. code.(See code selection)
- [2] Set Sip switch (9) to "CODE" mode. **[OPEN]**
- [3] 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.
- [4] Set "INITIATOR" Sip switch (10) to **[OPEN]** position to turn off verification tone. Code is now programmed into memory.

# CODED SELECTION

## SIP SWITCH

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

## SIP SWITCH

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

## SIP SWITCH

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

## SIP SWITCH

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	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	INT
445	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	INT

# CODED SELECTION CONTINUED

SIP SWITCH

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

## SIP SWITCH

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

## WARRANTY POLICY

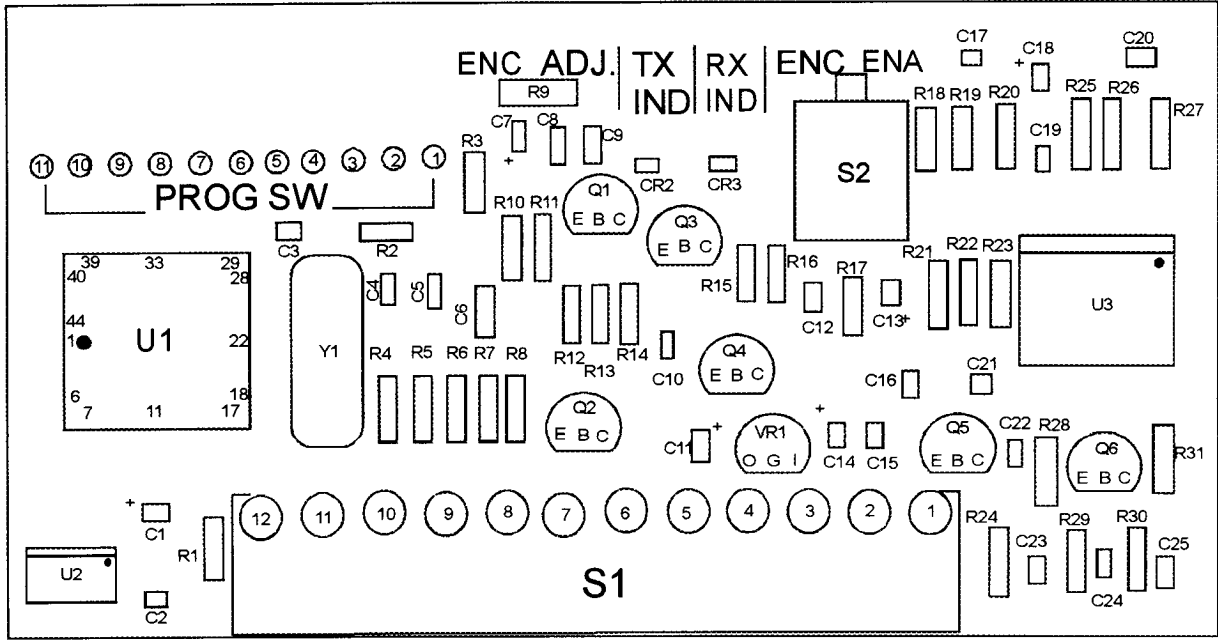
NorComm products are unconditionally guaranteed for two (2) years on materials and labor from date of purchase.

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--**

# COMPONENT LAYOUT



# SCHEMATIC LAYOUT

