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MODEL NC106 PROGRAMMABLE CTCSS ENCODER/DECODER
INSTRUCTION MANUAL

INTRODUCTION

The Model NC106 is a sub-miniature crystal controlled digital CTCSS Encoder/Decoder employing capacitor switching and digital period measuring techniques for discrete tone assignments. The NC106 has been designed to meet the CTCSS requirements of most commercial communication equipment and provides dip switch programming, allowing the user to field select any one of the standard 47 CTCSS tones without the need of tone measuring equipment.

GENERAL

The Model NC106 has been engineered for maximum reliability. However, should you require technical assistance or additional information, please contact our Customer Service department at (530) 477-8400.

SPECIFICATIONS

- FREQUENCY RANGE . . . . . Programming of all 47 tones
FREQUENCY STABILITY . . . . . Exceeds EIA specifications, ±0.1% Nominal
INPUT SENSITIVITY . . . . . 15mVrms to 1Vrms
INPUT IMPEDANCE . . . . . Greater than 50K Ohms
ENCODE OUTPUT LEVEL . . . . . Adjustable to 750mVrms (no load)
ENCODE DISTORTION . . . . . Less than 5% (THD)
DETECTION/DROP-OUT TIME . . . . . 220mS/220mS Nominal
HIGH-PASS FILTER . . . . . Elimination of CTCSS tone in received audio
OUTPUT CONTROLS . . . . . [A] Sink to Ground 50mA @ 40VCE
[B] Sourcing of 5VDC with Series and Steering Diode, and 5.6K resistor
[C] High-Pass Filter Disable
INPUT CONTROLS . . . . . [A] Selectable High or Low Encode Enable
[B] Selectable High or Low Decoder Disable
OPERATING VOLTAGE . . . . . +6VDC TO +24VDC
OPERATING CURRENT . . . . . 5mA Nominal
OPERATING TEMPERATURE . . . . . -20°C to +70°C
SIZE . . . . . 0.85"W x 1.35"L x 0.28"H
INTERFACING . . . . . Micro-miniature header and 12" color coded cable assy.
MOUNTING . . . . . Double Sided Adhesive Tape

--SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE--

# INTERFACING

The Model NC106 is supplied with a piece of double sided adhesive tape to eliminate the need for mounting hardware. Remove the protective covering from one side of the tape and apply to bottom side of P.C. Board. Now remove protective covering from remaining side of tape and adhere unit to desired location. Surface must be clean and dry to insure positive mounting. Although the Model NC106 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.

RED [+ SUPPLY]	Connected to +6VDC to +24VDC
BLACK [- SUPPLY]	Connect to system ground
GREEN [AUDIO INPUT]	Connect to receiver discriminator or high side of volume control not controlled by the squelch circuitry. NOTE: Breaking the audio path at either of these locations is ideal for insertion of the high-pass filter. (Refer to Violet lead)
YELLOW [ENCODE OUTPUT]	Connect to transmitter CTCSS input or at a point following all pre-emphasis, limiting circuitry. A series resistor may be necessary to eliminate input circuitry loading due to the low output impedance of the encoder. Adjust R1 for $\pm 75$ OHZ transmitter deviation.
GRAY [ENCODE ENABLE]	Connect to PTT "LOW" circuitry. For PTT "HIGH" remove solder bridge jumper from pads JU3-B&C and solder bridge jumper pads JU3-A&B. (For location of JU3-A,B&C see Top Side of P.C. Board).
BROWN [MONITOR]	This input is factory selected to activate decode output circuitry for monitoring of channel prior to transmitting when Brown lead is ungrounded. 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 used with a hang-up box. To reverse this configuration, remove solder bridge jumper from pads JU4-A&B and solder bridge jumper pads JU4-B&C. (For location of JU4-A,B&C, see Top Side of P.C. Board).
ORANGE [DECODE OUTPUT]	This output is factory selected for applications where a "Low" (to ground) is required to squelch receive audio. For applications requiring a "High" (sourcing), remove solder bridge from jumper pad JU6. (For location of JU6 see Top Side of P.C. Board). NOTE: OUTPUT SOURCING IS +5VDC IN SERIES WITH A 5.6K Ohm RESISTOR AND STEERING DIODE.
VIOLET [HI-PASS FILTER INPUT]	Solder bridge jumper pads JU1 and remove Violet lead when filter is to be connected in series with discriminator output or high side of volume control. For receivers requiring separate filter insertion or control of audio muting via high-pass filter see schematic Notes #1 and #2.
WHITE [HI-PASS FILTER OUTPUT]	Connect this lead to remaining side of broken audio path. This output contains buffered audio with CTCSS frequency removed.

# 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.



# PROGRAMMING CHART

#	CODE	FREQUENCY	PROGRAM LINES					
			1	2	3	4	5	6
1	XZ	67.0	1	1	1	1	1	1
2	--	69.3	1	1	1	0	0	1
3	XA	71.9	0	1	1	1	1	1
4	WA	74.4	1	1	1	1	1	0
5	XB	77.0	0	0	1	1	1	1
6	SP	79.7	1	1	1	1	0	1
7	YZ	82.5	0	1	1	1	1	0
8	YA	85.4	1	1	1	1	0	0
9	YB	88.5	0	0	1	1	1	0
10	ZZ	91.5	1	1	1	0	1	1
11	ZA	94.8	0	1	1	1	0	1
12	ZB	97.4	1	1	1	0	1	0
13	1Z	100.0	0	0	1	1	0	1
14	1A	103.5	0	1	1	1	0	0
15	1B	107.2	0	0	1	1	0	0
16	2X	110.9	0	1	1	0	1	1
17	2A	114.8	0	0	1	0	1	1
18	2B	118.8	0	1	1	0	1	0
19	3Z	123.0	0	0	1	0	1	0
20	3A	127.3	0	1	1	0	0	1
21	3B	131.8	0	0	1	0	0	1
22	4Z	136.5	0	1	1	0	0	0
23	4A	141.3	0	0	1	0	0	0
24	4B	146.2	0	1	0	1	1	1
25	5Z	151.4	0	0	0	1	1	1
26	5A	156.7	0	1	0	1	1	0
•	27	--	159.8	1	1	0	0	0
28	5B	162.2	0	0	0	1	1	0
29	6Z	167.9	0	1	0	1	0	1
30	6A	173.8	0	0	0	1	0	1
31	6B	179.9	0	1	0	1	0	0
•	32	--	183.5	1	1	0	0	1
33	7Z	186.2	0	0	0	1	0	0
•	34	--	189.9	1	1	0	0	1
35	7A	192.8	0	1	0	0	1	1
•	36	--	196.6	1	1	0	1	0
*	37	--	199.5	1	1	0	1	0
38	M1	203.5	0	0	0	0	1	1
•	39	8Z	206.5	1	1	0	1	1
40	M2	210.7	0	1	0	0	1	0
41	M3	218.1	0	0	0	0	1	0
42	M4	225.7	0	1	0	0	0	1
•	43	9Z	229.1	1	1	0	1	1
44	--	233.6	0	0	0	0	0	1
45	--	241.8	0	1	0	0	0	0
46	--	250.3	0	0	0	0	0	0
•	47	--	254.1	1	1	1	0	0
	NO TONE		1	1	0	0	0	0

**\*Non-standard tone**

Dip switch  
 "0"=Closed (ON)  
 "1"=Open (OFF)

Solder jumpers  
 Solder bridged (ON)  
 1=Unbridged (OFF)