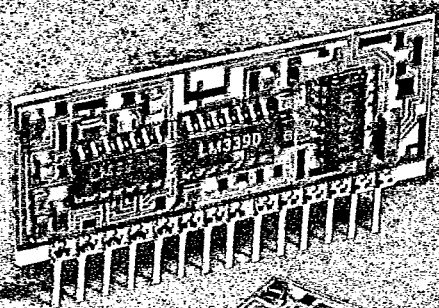
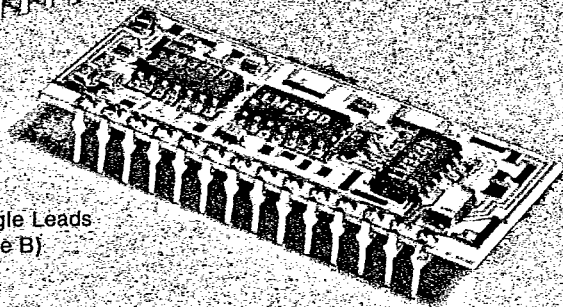


White
Technology, Inc.

CTCSS
ENCODER/DECODER
86051A, 86051B
86052A, 86052B



Straight Leads
 (Type A)

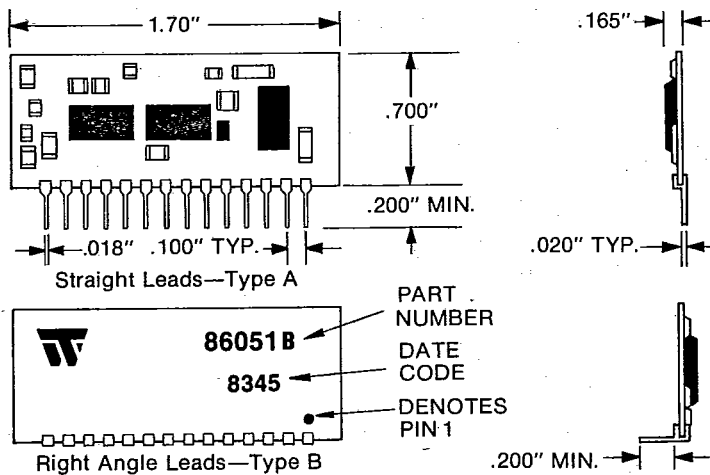


Right Angle Leads
 (Type B)

FEATURES

- Complete CTCSS Capability for Encode and Decode
- Resistor Programming
- Low Power Consumption
- Rugged Surface Mounted Construction
- Meets or Exceeds EIA Specifications

CASE OUTLINES



DESCRIPTION

86051A, 86051B Encode/Decode
86052A, 86052B Encode Only

The 86051 and 86052 are a series of low cost tone products which meet or exceed all EIA specifications. The 86051 is configured for encode and decode operation, while the 86052 is configured for encode operation only. Each version is available with straight or bent leads to facilitate installation.

Frequency programming is accomplished via a single precision resistor or a low TCR potentiometer. Multi-tone programming may be provided with precision resistors and solid state switching.

Both versions are constructed using the latest in surface mount technology. Small outline packages have been used to afford greater circuit density, thereby reducing overall size.

CTCSS ENCODER/DECODER 86051A & B, 86052A & B

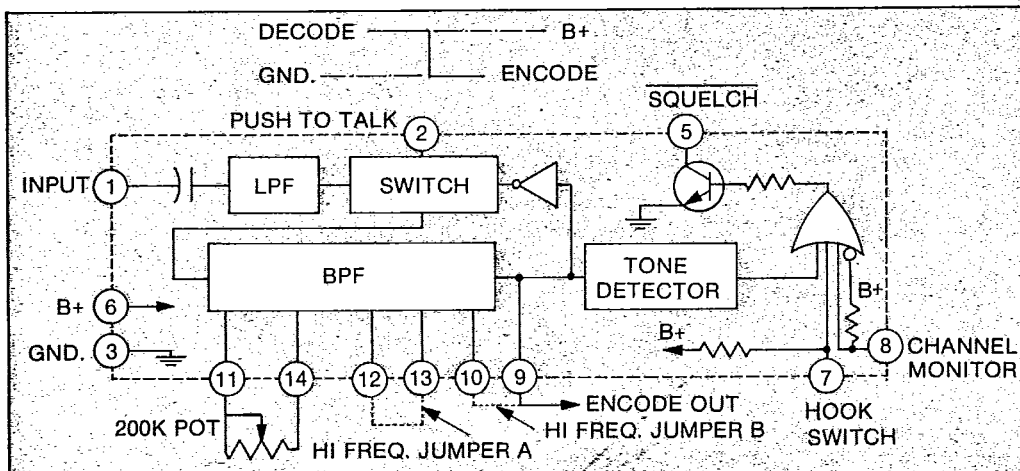
ABSOLUTE MAXIMUM RATINGS

| CHARACTERISTIC | SYMBOL | MINIMUM | TYPICAL | MAXIMUM | UNITS |
|-----------------------------|-----------|---------|---------|---------|-------------|
| Operating Voltage | B+ | | | 30 | Vdc |
| Input Signal | V_{in} | | | 10 | V_{rms} |
| Open Circuit Voltage | V_{off} | | | B+ | Vdc |
| Operating Temperature Range | T_A | -30 | | +70 | $^{\circ}C$ |
| Storage Temperature Range | T_{stg} | -40 | | +100 | $^{\circ}C$ |

ELECTRICAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MINIMUM | TYPICAL | MAXIMUM | UNITS |
|----------------------------|-----------|---------|---------------------|---------------------|------------|
| Frequency Range | f_o | 67 | | 250.3 | Hz |
| Operating Current | I+ | | 3 | 10 | mAdc |
| Capture Band Width | BW | ± 2 | $\pm 2 \frac{1}{4}$ | $\pm 2 \frac{1}{2}$ | % |
| Detection Time | t_{on} | | 100 | 150 | ms |
| Squelch Tail | t_{off} | | 250 | 400 | ms |
| Decoder Input Impedance | Z_{in} | 100 | 200 | | K Ω |
| Input Signal Threshold | v_t | | | 3.5 | mV_{rms} |
| Squelch Saturation Voltage | V_{sat} | | .100 | .400 | Vdc |
| Squelch Sink Current | I_{sat} | 6 | 16 | | mAdc |
| Encode Output Impedance | Z_o | | 100 | | Ω |
| Total Harmonic Distortion | THD | | .5 | 1 | % |
| Encode Turn-On Time | t_{eon} | | 10 | 30 | ms |
| Low Frequency Range | f_{Lo} | 50 | | 130 | Hz |
| High Frequency Range | f_{Hi} | 100 | | 260 | Hz |

FIG. 1 BLOCK DIAGRAM



| PIN | FUNCTION |
|-----|---------------------|
| *1 | Input |
| 2 | Push To Talk |
| 3 | Ground |
| 4 | NC |
| *5 | SQUELCH |
| 6 | B+ |
| *7 | Hook Switch Monitor |
| *8 | Channel Monitor |
| 9 | Encode Out/Jumper A |
| 10 | Hi Freq./Jumper A |
| 11 | Tuning Pot |
| 12 | Hi Freq./Jumper B |
| 13 | Hi Freq./Jumper B |
| 14 | Tuning Pot |

*Pins not used on 86052.

CTCSS ENCODER/DECODER 86051A & B, 86052A & B

CHARACTERISTIC CURVES

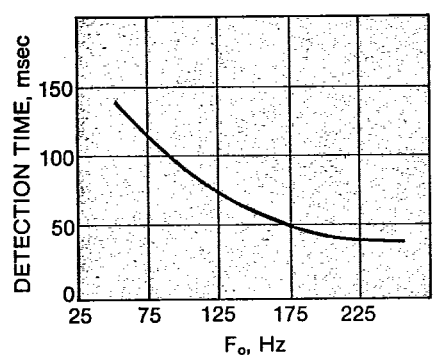


FIG. 1 DETECTION TIME vs. CENTER FREQUENCY

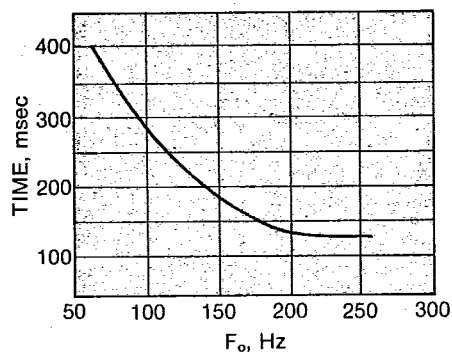


FIG. 2 SQUELCH TAIL vs. CENTER FREQUENCY

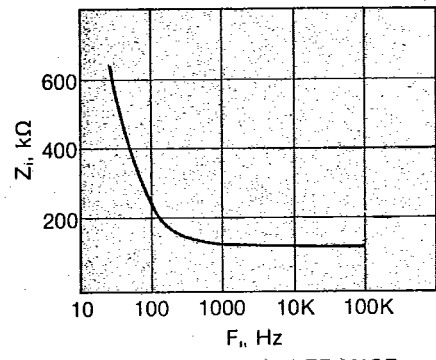


FIG. 3 INPUT IMPEDANCE vs. FREQUENCY

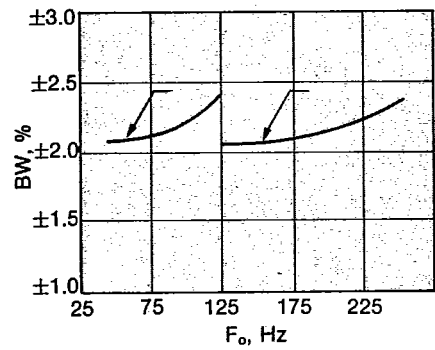


FIG. 4 CAPTURE BW vs. CENTER FREQUENCY

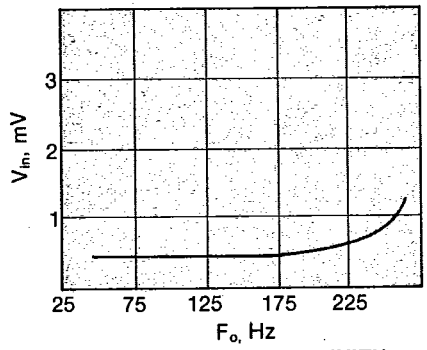


FIG. 5 INPUT SENSITIVITY vs. FREQUENCY

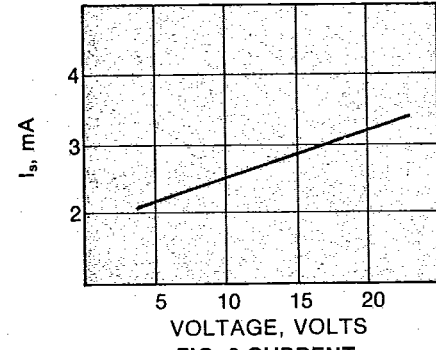


FIG. 6 CURRENT vs. SUPPLY VOLTAGE

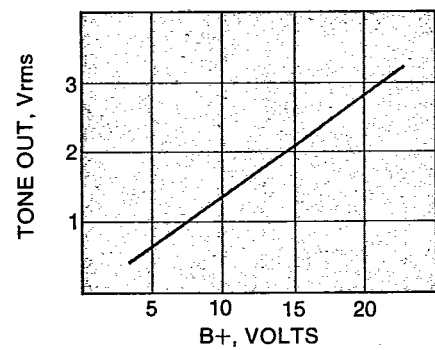


FIG. 7 ENCODER OUTPUT vs. SUPPLY VOLTAGE

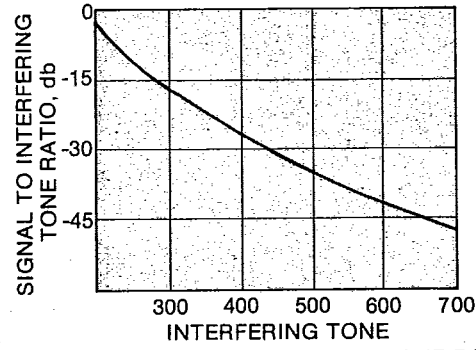


FIG. 8 SIGNAL TO INTERFERING TONE RATIO vs. INTERFERING TONE FREQUENCY

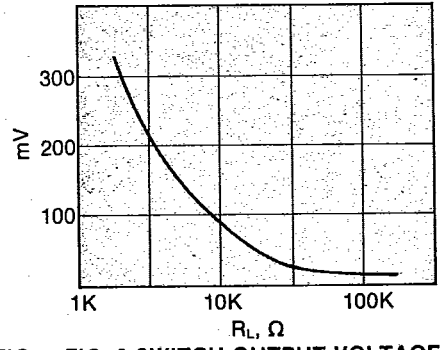
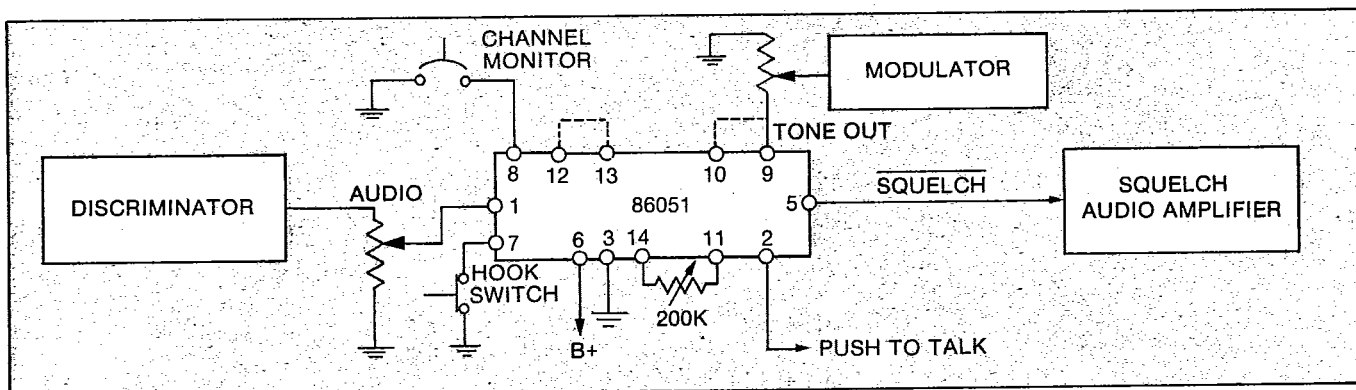
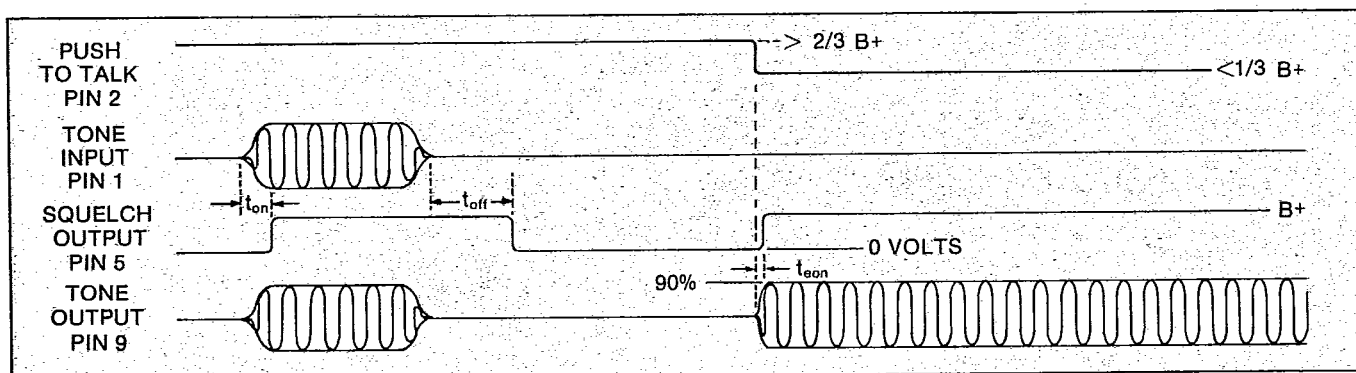


FIG. 9 SWITCH OUTPUT VOLTAGE vs. LOAD RESISTANCE

CTCSS ENCODER/DECODER 86051A & B, 86052A & B**SYSTEM HOOKUP****TIMING DIAGRAM****THEORY OF OPERATION**

In the decode mode, the 86051 detects the proper frequency and releases the squelch (pin 5 open collector).

Frequency is set via a resistance between pins 11 and 14. A single precision resistor or a low TCR potentiometer is recommended for lowest temperature variation.

In the encode mode, the 86051 generates a precise frequency on pin 9.

The CTCSS frequencies are separated into two ranges. Adding jumpers to pins 12 and 13, and pins 9 and 10 switches the 86051 into high frequency operation.

Channel monitoring can be accomplished two ways: releasing pin 7 from ground (Hook Switch) allows the monitoring of a channel before transmitting, and grounding pin 8 (Channel Monitor) also allows monitoring of channel traffic.

The 86051 A and B are intended for use in mobile or handheld radios. In certain applications, some shielding may be required to prevent falsing, especially in high RFI environments.