

Ferritronics

CTCSS PRICE BREAKTHROUGH!



WE LOWERED THE PRICE — NOT THE QUALITY

When you see a price this low on a complete CTCSS Encoder/Decoder, you may be a little skeptical. And you should be. However, you should know that we are not newcomers to the tone business operating out of our garage or basement.

Ferritronics has been in business for over 21 years and operates from a modern 16,000 square foot factory. We have supplied hundreds of thousands of tone modules to radio dealers and manufacturers in the U.S., Canada and around the world.

Our experience has taught us how to build a simple tone squelch without compromising quality. But how can we make the price so low?

First, we designed this unit to use standard value off-the-shelf components. No custom IC's. This makes it cheaper for us to build and cheaper for you to repair.

Second, we designed it to be truly universal. This one model will fit almost any mobile or portable. Therefore, higher volume production runs lower costs.

Third, we do not offer individual application notes. Instead, we provide a comprehensive generic application note which an average technician can use to interface with virtually any radio.

Fourth, this is a cash-and-carry price. No open account terms means positive cash flow, again lowering our overall costs.

Our one year parts and labor warranty applies and so does our 30 day return privilege.

If this product fails to satisfy you for any reason, return it within 30 days for full refund of the purchase price. No question asked.

CALL TOLL FREE TO ORDER

Ferritronics, Inc.
1319 Pine Ave.
Niagara Falls, NY. 14301
Telex: 64-6303
Telephone: (800) 828-6884
NY, AK, HI: (716) 282-7470



FERRITRONICS
SIGNALLING AND CONTROL

SPECIFICATIONS

FT128U CTCSS ENCODER/DECODER SPECIFICATIONS

SUPPLY REQUIREMENTS:	Voltage: 8 to 16VDC Current Drain: 12mA standby typical @ 13.6VDC.
FREQUENCY:	Continuously tunable-over CTCSS frequency band in four ranges. Stability: $\pm .25\%$ over temperature range -30°C to $+60^{\circ}\text{C}$. Bandwidth: $3.5 \pm .5\text{Hz}$ constant over frequency range.
ENCODE:	
Tone Encode:	a) ground to encode or b) absence of positive bias to encode
Output Level:	0-1Vrms-continuously adjustable into 5K Ohm load at 13.6VDC supply (maximum output level varies directly with supply voltage).
Distortion:	$< 2\%$ THD
DECODE:	
Input Impedence:	500K Ohm (minimum)
Input Sensitivity:	10 mVrms @ 200 Hz.
Decode Time:	135 ms (typical)
Dropout Delay Time:	160 ms (typical)
High Pass Filter:	Input common with Decoder. > 20db @ 250 Hz. > 40 db @ 100 Hz.
Monitor:	a) Hook Switch- OFF ground to monitor or b) Monitor Switch- ground to monitor
Audio Control:	Direct muting of High Pass Filter or open collector (un-grounded on receipt of correct tone.)
MECHANICAL:	
Dimensions:	Length- 1.70 inch Width- 1.20 inch Height- 0.5 inch

Canada

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FT128U CTCSS ENCODER/DECODER

GENERAL

The FT128U Sub-Audible Tone Squelch is a complete Encoder/Decoder assembly designed to interface with the majority of FM two-way radios. This unit also includes an audio High Pass Filter to suppress the sub-audible tone from the receive audio and two separate modes of the Monitor function.

CIRCUIT DESCRIPTION

Decode Mode

The received tone coupled to ③ (Signal Input) of the tone board where it is passed through the Low Pass Filter (IC1A and related components) which has it's -3dB point at approximately 250 Hz. In the Decode Mode transistor Q1 is off and the signal is coupled through to the limiter stage (IC1B, D1, D2). The signal is squared by IC1B and a constant amplitude is maintained by R12, D1 and D2. The limited squared signal is coupled through R13 to a highly selective and stable Band Pass Filter (IC1C and IC1D) with it's center frequency determined by R14, R19 and R20. To increase stability and resolution in frequency adjustment, the frequency band is split into four ranges by J1 and J2.

The recovered tone is rectified by Q3 and filtered by C14 to provide positive voltage to turn Q4 on which turns Audio Gate (Q5) off. This enables the input of the High Pass Filter (C16, C17 and Q6) and allows the received audio to pass through to ⑦.

Encode Mode

When ⑤ is grounded, Q1 is turned on and Q2 is turned off. This enables the positive feedback loop R25, R9 and IC1B around the Band Pass Filter to create an oscillator, generating a sinusoidal signal at the center frequency of the Band Pass Filter. The tone is coupled through potentiometer R21, R22 and C11 to ⑧.

Monitor Mode

The squelch function can be disabled by two different options.

1. With J4 removed and ⑥ connected to the microphone hook switch. When the low side of R29 is removed from ground, Q4 turns on which turns the Audio Gate off.
2. With J4 installed, applying a ground to J6 ③ turns the Audio Gate off.



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Current Drain: 12mA standby typical @ 13.6VDC.
- FREQUENCY: Continuously tunable-over CTCSS frequency band in four ranges.
Stability: $\pm 0.25\%$ over temperature range -30°C to $+60^{\circ}\text{C}$.
Bandwidth: $3.5 \pm .5\text{Hz}$ constant over frequency range.
- ENCODE:
- Tone Encode: a) ground to encode or
b) absence of positive bias to encode
- Output Level: 0-1Vrms-continuously adjustable into 5K Ohm load at 13.6VDC supply (maximum output level varies directly with supply voltage).
- Distortion: $< 2\%$ THD
- DECODE:
- Input Impedence: 500K Ohm (minimum)
- Input Sensitivity: 10 mVrms @ 200 Hz.
- Decode Time: 135 ms (typical)
- Dropout Delay Time: 160 ms (typical)
- High Pass Filter: Input common with Decoder (Jumper Option)
 $\geq 20\text{db}$ @ 250 Hz.
 $\geq 40\text{db}$ @ 100 Hz.
- Monitor: a) Hook Switch- OFF ground to monitor or
b) Monitor Switch- ground to monitor
- Audio Control: Direct muting of High Pass Filter or open collector (un-grounded on receipt of correct tone).
- MECHANICAL:
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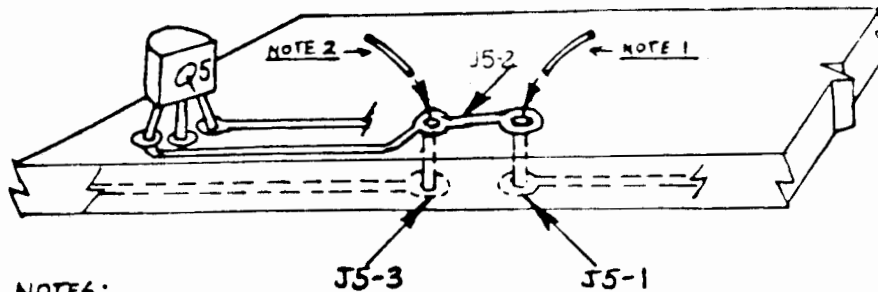
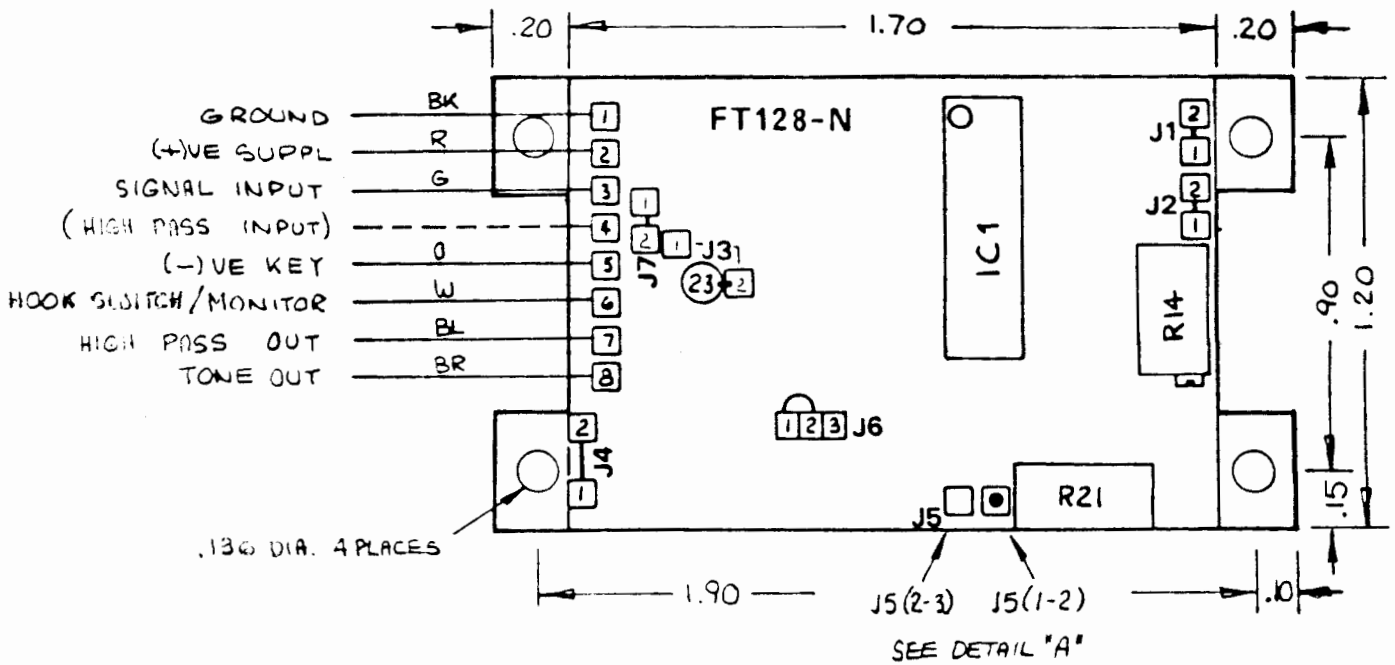
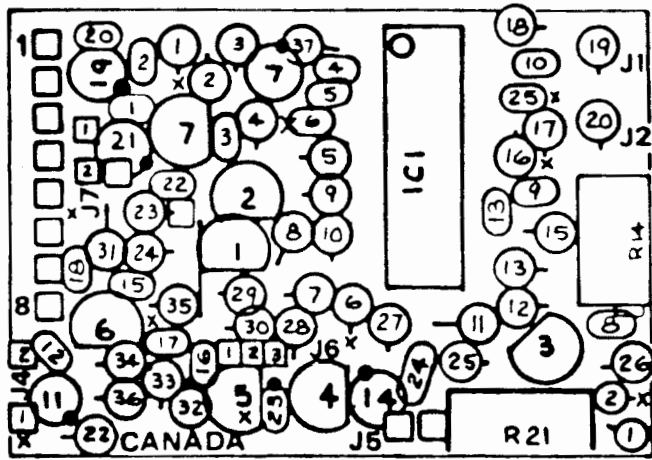
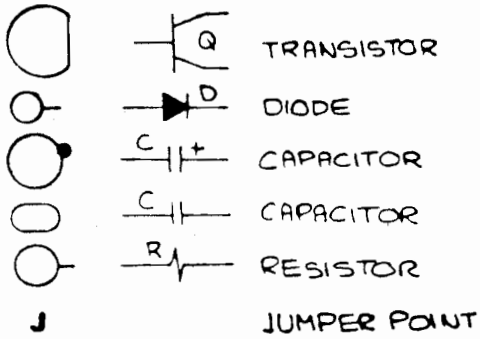


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- NOTES:**
 1 - INSERT WIRE TO CONNECT J5-1 TO J5-2 OR -
 2 - INSERT WIRE TO CONNECT J5-2 TO J5-3

DETAIL "A"

A

TITLE FT 128-N PHYSICAL/MECHANICAL DETAIL		REV. NO. R510	DATE	FILE SP128
FERRITRONICS LIMITED		SCALE NTS	DWG. NO. 11	SS. E. 5
CHANGE	ISS.	SMT. 1	OF 1	

APPLICATION NOTE

AP0003S

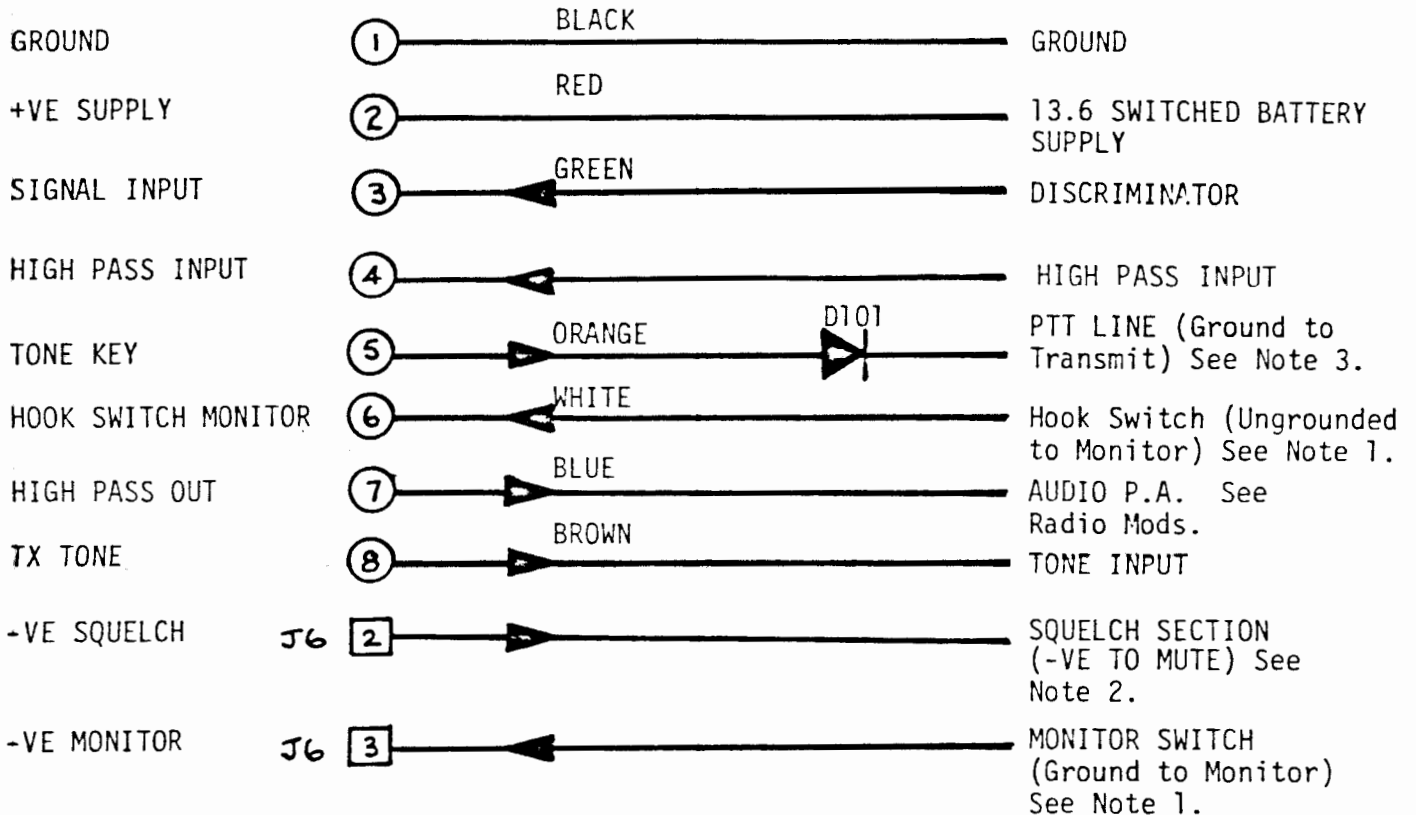
SP419
ISS 3
SHT. 1 OF 1

PRODUCT: FT128U-1 CTCSS

RADIO. UNIVERSAL APPLICATION

SIGNALLING UNIT CONNECTIONS

RADIO CONNECTIONS



Direction of Signal

NOTES:

1. If Ground to Monitor is required, disconnect the White wire from ⑥ and connect to J6 ③.
2. If Audio Control is required at another point in radio, remove Jumpers from J5-1, 2 and J6-1, 2. Install Jumper in J5-2,3 and use J6-2 for Audio Control (J6-2 is Ground through Q5 when no tone present).
3. If Loading occurs add D101.

PARTS LIST:

IN914 or Equivalent Diode

RADIO MODIFICATIONS:

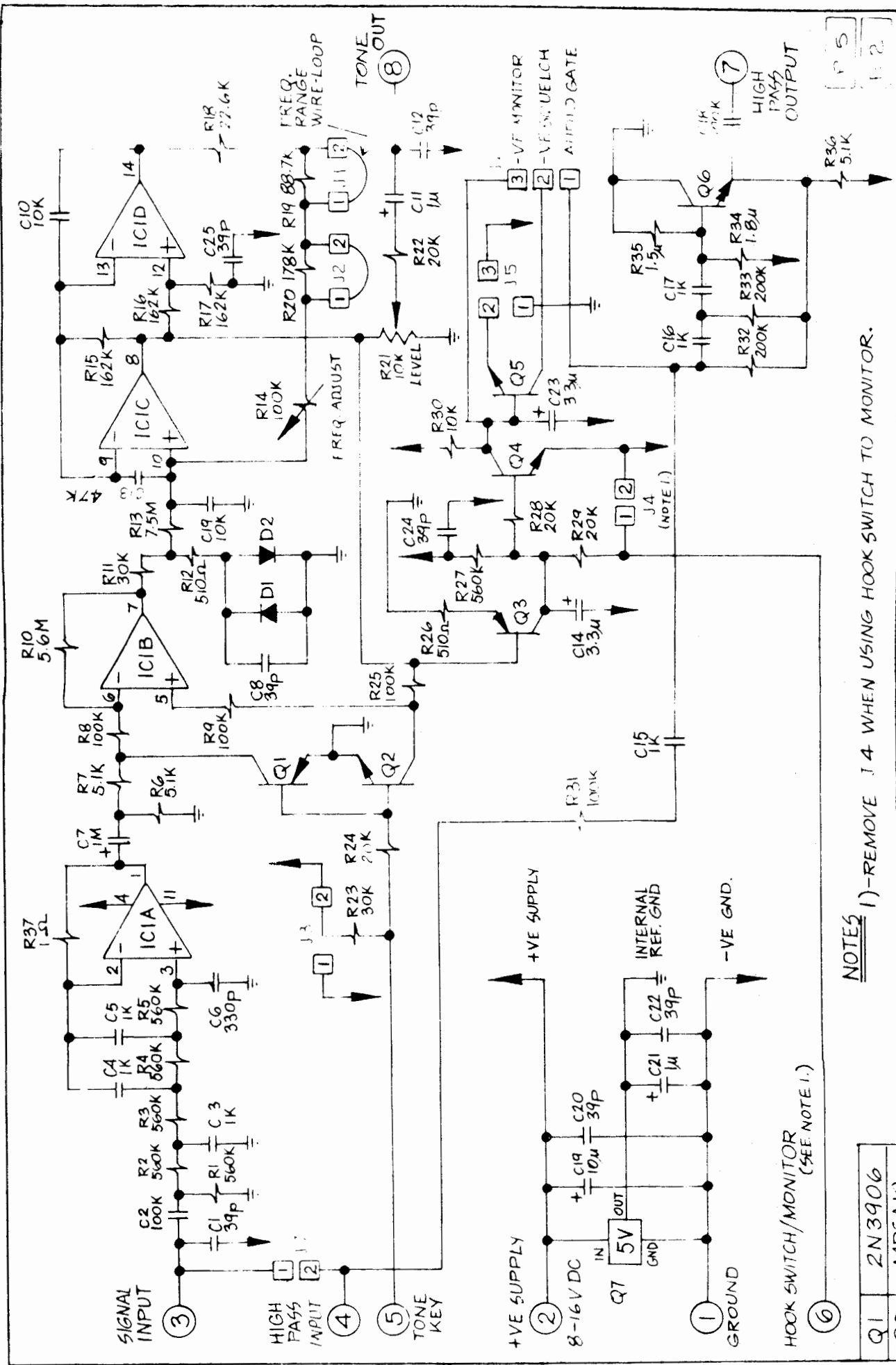
Break Audio Path before De-Emphasis Circuit.

THIS IS A RECOMMENDED INSTALLATION PROCEDURE BASED ON THE BEST INFORMATION AVAILABLE TO US AT THE TIME OF PRINTING; HOWEVER FERRITRONICS DOES NOT ACCEPT ANY RESPONSIBILITY FOR ANY DAMAGE WHICH COULD RESULT FROM THE USE OF THIS PROCEDURE.



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SIGNALLING AND CONTROL

A



NOTES 1)-REMOVE J4 WHEN USING HOOK SWITCH TO MONITOR.

Q1	2N3906
Q2	MPSA18
Q3	2N3906
Q4	2N3904
Q5	2N3904
Q6	MPSA13
Q7	55L05A

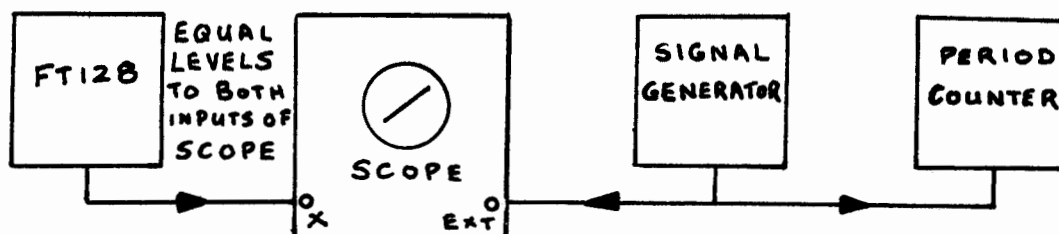
FILE	SP-419-B
APPR.	J.A.C.
DATE	1981/10/14
TITLE	FT-128-UI TONE SQUELCH
SCALE	1 OF 1
DWG. NO.	02
ISS.	5



FERRITRONICS LIMITED

FT128 TUNING INSTRUCTIONS

NOTE: The encode and decode functions share the same active filter circuit, therefore only the encoder tuning procedure is used.



LISSAJOUS COMPARISON SET-UP

1. Adjust signal generator to desired frequency.
2. Set frequency range on FT128 according to following chart.
3. Adjust R14 (Frequency Adjust Potentiometer) until the image on the scope is a 45° line. (Adjust slowly up to desired frequency. If frequency is passed, continue for one full turn before adjusting back to desired frequency).
4. The frequency is correct when there is no appreciable change in the lissajous figure after one minute.

TUNING CHART

#1 JUMPER #2		FREQ. RANGE (HZ)
OUT	OUT	63.3 — 72.9
IN	OUT	72.1 — 87.8
OUT	IN	86.2 — 117.5
IN	IN	113.5 — 259.2