

# PRODUCT INFORMATION

PRODUCT INFORMATION With compliments of Island Labs D/1103/1 JANUARY 1982

Av. £ 2700

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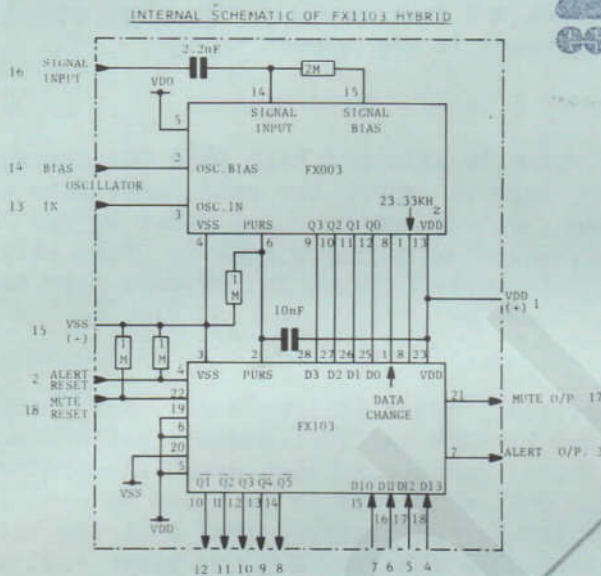


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ESCO ITALIANA s.r.l.  
ELECTRONIC SUPPLY CO  
Via Villa Mirabello, 6  
20125 MILANO  
☎02/6072441-2-3-4-5

## FX1103 LOW POWER SELECTIVE CALL DECODER



### FEATURES

- \* LOW POWER CONSUMPTION
- \* SINGLE-IN-LINE HYBRID CONSTRUCTION
- \* FX1103C DECODES CCIR TONESET
- \* FX1103Z DECODES ZVEI TONESET
- \* GROUP CALL DECODING
- \* DUAL ADDRESS FEATURE
- \* CODED AUDIO ALERT OUTPUT
- \* 'ABSENT PAGE' MEMORY

### DESCRIPTION

The FX1103 is a 5-tone selcall decoder packaged in a S.I.L. thick film hybrid encapsulation. The FX1103 includes an FX003 tone decoder tuned to either CCIR or ZVEI tones and an FX103 address decoder. The FX1103 can operate from a three cell battery and consumes a minimum of power.

### OPERATION

The hybrid decodes sequential 5 tone selective calling signals, and compares the incoming information with an address stored in a memory. The FX1103 automatically generates an interrupted audio alert signal when it decodes its correct address sequence. A continuous audio alert is generated when the decoder receives its address followed by an additional instruction tone (tone C). This provides a two address pager from only one address code.

## Group Call.

The hybrid will decode group calls where any one or more digits of the address have been replaced by a group frequency (tone A). Groups ranging from ten units to all the pagers on a network can be simultaneously called. The hybrid will output a distinctive audio alert pattern when a group call is decoded. The additional second address instruction tone is also valid for group calls and causes the circuit to generate a continuous alert.

## Audio Alert Memory.

The audio 'Alert' output can be manually reset by the 'Alert Reset' input. If the audio is not reset within 10 seconds the hybrid will clear the 'Alert' output. The audio pattern type is then loaded into a memory. Pressing the audio reset button will cause the memory contents to be reloaded into the alert pattern generator. This "absent page memory" feature stores the last audio alert output which self-timed out. The audio pattern output can be reset in the normal manner.

## Mute Output.

The FX1103 includes a 'Mute' output which is switched high when the device decodes an incoming selective call. This can be used to enable the audio amplifier of pagers equipped for "tone + voice" operation. It remains on until reset by the 'Mute Reset' input. The 'Mute' output can be considered as a call signal in "tone only" applications. In this case the 'Mute Reset' and 'Alert Reset' inputs can be connected together.

## Transmitted Instruction Codes.

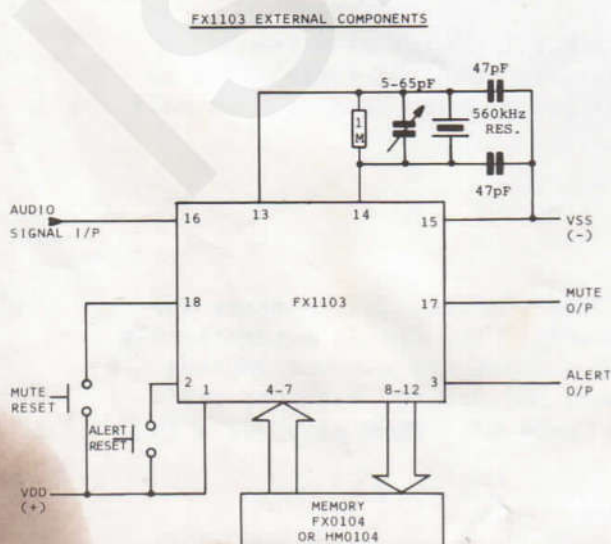
The FX1103 can decode selectively addressed reset instructions, using extra tones decoded in addition to those specified by CCIR and ZVEI. Address suffix tones can be added after a selcall to reset the 'Mute' output and also erase the memory. The Mute is reset when tone D follows a call. Only when this is followed by tone C will the device erase the memory, any other state (or no transmission) will inhibit the erasure. These transmitted instructions are also valid under group calling conditions.

A voice paging system organised with transmitted reset instructions offers the possibility of hands-free operation at the receiver.

## Power On Reset.

Power on reset components are included in the hybrid. This prevents malfunction when power is applied. A 5 second burst of rapid pips is generated at the 'Alert' output as a power on test. The maximum power supply rise time (to 90%) for correct operation is 2ms.

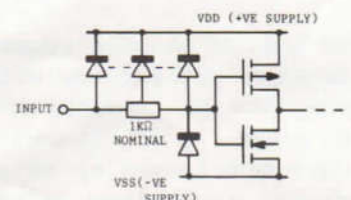
## EXTERNAL COMPONENTS.



The FX1103 requires a 560kHz clock which can be derived from a ceramic resonator as shown, and tuned to the precise frequency by a variable (or select-on-test) capacitor. Pin wiring should be kept short. The frequency is monitored at pin 14 by a high impedance counter with low capacitive loading. This single adjustment tunes all the receiver frequencies.

## HANDLING.

The FX1103 contains CMOS LSI integrated circuits which include input protection circuitry as shown. However, precautions should be taken to prevent static discharges which can damage the circuitry.



## External Address Memory.

The selective calling address must be stored in a separate external memory. The memory input and output lines of the FX1103 have been designed to interface directly to fusible link diode matrices. Selcall numbers are programmed into the matrices directly and without repeat codes (code E). The circuit automatically recognises where successive address digits are identical and searches for the repeat tone. The code E is used in the memory where less than five address digits are used. It is programmed into the external memory after the last digit and instructs the FX1103 to search for address suffix tone codes or the no transmission state.

The  $\overline{Q1} - \overline{Q5}$  outputs are taken to the cathodes of the diode matrix and the anodes are connected to the D10 - D13 inputs.

### EXAMPLES OF FX1103 CALL DECODING

The local address number is 12345

#### TRANSMITTED TONES

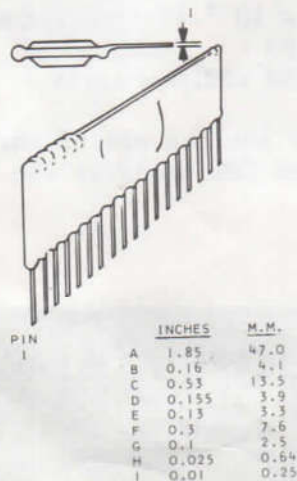
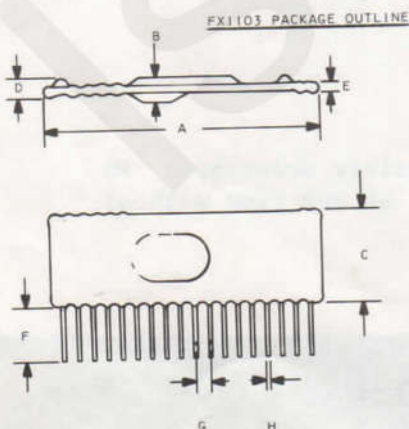
#### FX1103 ACTION

12345	Interrupted alert output Mute high.
12345C	Continuous alert output, Mute high.
12A45	Group pattern alert output, Mute high.
AEAEA	All call. Group pattern alert output on all units. Mute high.
12345D	No alert output. Reset Mute (i.e. low).
12345DC	No alert output, reset Mute (i.e. low) clear memory.
AEAEAD	Mute all units. No outputs.

Where A is the Group frequency  
E is the Repeat frequency

C & D are additional signalling tones.

## PACKAGE DETAILS



## PIN DESIGNATION

- 1 VDD (+ve supply)
- 2 Alert Reset I/P
- 3 Alert O/P
- 4 D13 Data I/P (M.S.D.)
- 5 D12 Data I/P
- 6 D11 Data I/P
- 7 D10 Data I/P (L.S.D.)
- 8  $\overline{Q5}$  O/P
- 9  $\overline{Q4}$  O/P
- 10  $\overline{Q3}$  O/P
- 11  $\overline{Q2}$  O/P
- 12  $\overline{Q1}$  O/P
- 13 Oscillator I/P
- 14 Oscillator Bias
- 15 VSS (-ve supply)
- 16 Signal Input
- 17 Mute O/P
- 18 Mute Reset I/P

## MAXIMUM RATINGS

Maximum voltage between any pin and -VE supply Pin 15. -0.3 volts to (VDD +0.3) volts  
Operating temperature range -10° to +60°C  
Storage temperature range -20° to +85°C

## OPERATING CHARACTERISTICS

Unless otherwise stated VDD = 3.6 volts  $\phi = 560\text{kHz}$   
TA = 25°C, Signal Input Level 100mV rms, Gaussian Noise Bandlimited at 6kHz,  
Input Tone period: 100ms (CCIR) 70ms (ZVEI) No signalling frequency offset.

CHARACTERISTIC	MIN	TYP	MAX	UNITS
Supply voltage (Vss = 0V)	3.3	3.6	4.5	Volts
Supply current at 3.6 volts		700		µA
Signal input level(full spec.operation)	35		Vdd	mV rms
Input impedance (pin 16)		2		MΩ
Minimum Decoder Bandwidth CCIR	±1%			(1)
Minimum Decoder Bandwidth ZVEI	±2%			(1)
Frequency offset for NO decode CCIR	±3%			(2)
Frequency offset for NO decode ZVEI	±4.5%			(2)
Signal to noise ratio performance	0dB			(1)
Input tone period (each tone) CCIR	40	100		ms
Input tone period (each tone) ZVEI	40	70		ms
False decode probability from Gaussian noise (5 tone address) CCIR		$2.5 \times 10^{-31}$		(3)per hr
ZVEI		$4.8 \times 10^{-25}$		(3)per hr
Alert output frequency		2.121		kHz
Alert output duration			10	seconds
Alert output impedance		5		kΩ
Logic 1 input(pins 2,18) at Vdd = 3.6V	3.0			Volts

### NOTES:

- 1) Decode probability >0.075 (5 tone sequence)
- 2) Decode probability < $2.5 \times 10^{-8}$  (5 tone sequence)  
<0.003 (each tone)
- 3) Including group and second address calls.

CML does not assume any responsibility for the use of any circuitry described. No circuit patent licences are implied and CML reserves the right at any time without notice to change said circuitry.



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WHEATON ROAD · INDUSTRIAL ESTATE EAST  
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Telex: 99382

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Telephone: 0376 513833