Island Labs

PRELIMINARY INFORMATION

PUBLICATION D/224

FX-003-QA
FX-003-QC
FX-003-QE
FX-003-QZ

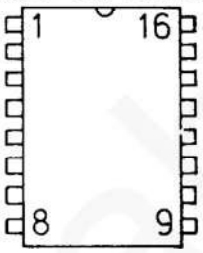
QTC TONE DECODERS

PIN FUNCTIONS

1	23kHz clock out	9	Q3
2	Osc.out	10	Q2
3	Osc.in	11	Q1
4	Vss	12	Qo
5	$\overline{\text{HOLD}}$	13	Vdd
6	Power up reset	14	Signal input
7	*	15	Signal bias
8	Data change	16	*

*Connected internally. Do not tie

PIN CONFIGURATION
(16 lead Dual in Line)



(Package width 0.6")

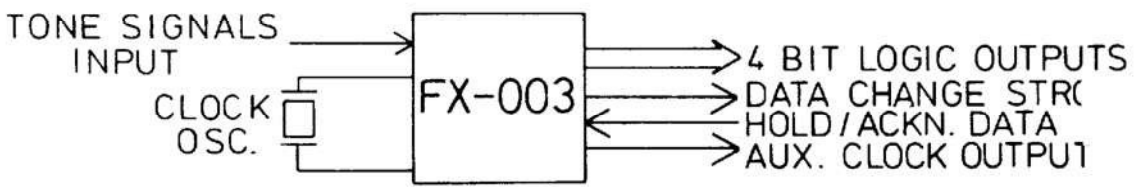
TONE FREQUENCY OPTIONS

SUFFIX	QTC TONESET
QZ	ZVEI
QA	EIA
QC	CCIR
QE	EEA

FEATURES

- DECODES ALL 15 TONES IN QTC TONESET
- 4-BIT HEX CODED OUTPUT WITH STROBE
- PLUG-IN COMPATIBLE VERSIONS FOR ZVEI-CCIR-EEA-EIA FREQUENCIES
- ON-CHIP DIGITAL FILTERS; FULL-SPEC OPERATION DOWN TO 0dB SNR TYPICAL
- ≥30dB SIGNAL INPUT RANGE
- LOW FALSE RESPONSE RATE; NOISE SIMULATED DECODES PREDICTED AS ONE PER 10^{14} YEARS FOR 5 DIGIT CODE
- ON-CHIP OSCILLATOR USES LOW COST RESONATOR.
- LOW EXTERNAL PARTS COUNT
- LOW POWER CMOS PROCESS
- 25mS TYPICAL RESPONSE TIME; EQUALISED FOR ALL TONE CHANNELS

BLOCK FUNCTION



DESCRIPTION

The FX-003 detects an input frequency falling within any of the fifteen tone channels programmed on-chip, and outputs the channel number in 4-bit binary code. This "1 from 15" random decode capability is achieved through very advanced new digital filtering techniques, which also ensure accurate channel bandwidths, equal channel response times and full-spec decoding under high noise signalling conditions. No external signal conditioning or filtering is required, and signals of wide dynamic range are accepted. Absence of a valid input tone gives the 16th logic state.

A "Data Change" output signals each change in the output code and may be used with the "Hold/Acknowledge" input to establish handshake routines with μP and other data processing logic. A special power-up code output routine prevents incorrect HSC* address decoding if power-up occurs during an input code sequence. (*see "HSC Signalling Format" data).

Master clocks for the digital filter stages are derived from an on-chip oscillator and external 560Hz ceramic resonator; the decode channel bandwidths having worst case tolerances calculated to include the specified resonator tolerance. A 23.3kHZ output clock is provided for use by other '03 series devices.

The FX-003 is scheduled in a number of pin and function compatible versions, each programmed in accordance with the frequencies and bandwidths of a specified QTC toneset.

ELECTRICAL CHARACTERISTICS (VDD = 5V, CLOCK 560kHZ, $-30°C \leqslant TA \leqslant +85°C$)

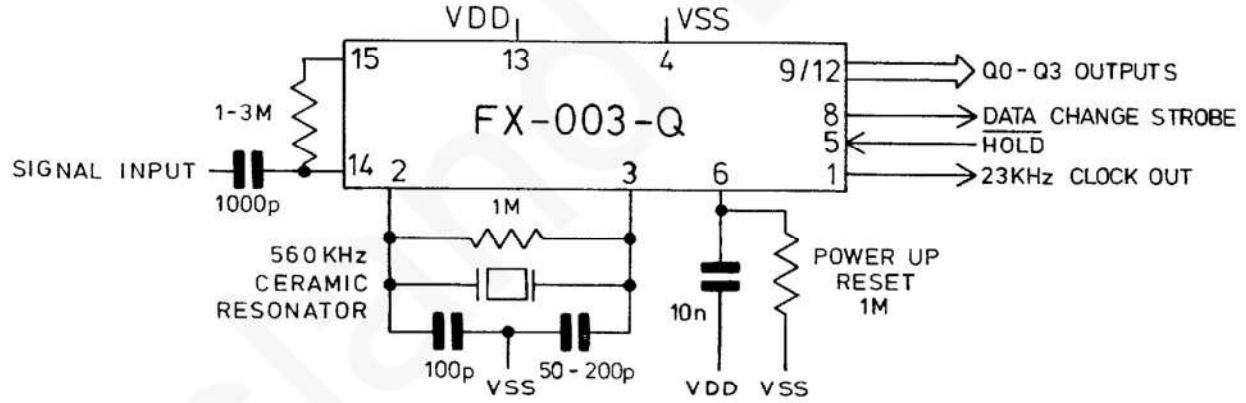
	Characteristic		Min	Typ	Max		Unit & notes
VDD	Supply voltage (Vss=0V)		*	5	8	V	*not yet specified
IDD	Supply current			500		μA	
VOH	Logic output level	'1'	4.5			V	I source 0.1mA
VOL	(pins 1, 8, 9, 10, 11, 12)	'0'			0.5	V	I sink 0.1mA
VIH	Logic input level	'1'	3.5			V	
VIL	(pin 5)	'0'			1.5	V	
V' in	Signal input range		0.1		VDD	Vpk-pk	AC coupled, sine/square
Bw	Decode bandwidth	QA	20			± Hz	(1) SNR 3dB
	($P \geqslant 0.995$)	QC	1			±%	SNR 0dB
		QE	1			±%	SNR 3dB
		QZ	2			±%	SNR 0dB
$\overline{Bw}$	Not-decode bandwidth	QA			60	±Hz	(2) All conditions of
	($P \leqslant 0.03$)	QC			3	±%	input SNR and
		QE			3	±%	amplitude
		QZ			4.5	±%	
	Noise response rate	QA		0.15		Hours	(3) Gaussian input
	(hours per F→$\overline{F}$→F single	QC		40		Hours	noise, Bw 6kHz,
	character response with	QE		40		Hours	max input level.
	no input tone)	QZ		1		Hours	
	Decode response time:						
Tr	Notone to tone (F→$\overline{F}$)		20	25	Tp	mS	(4)
Tf	Tone to notone ($\overline{F}$→F)		33		50	mS	
	Min. interntone gap for 'F'		15		28	mS	(5) Included in Tf.

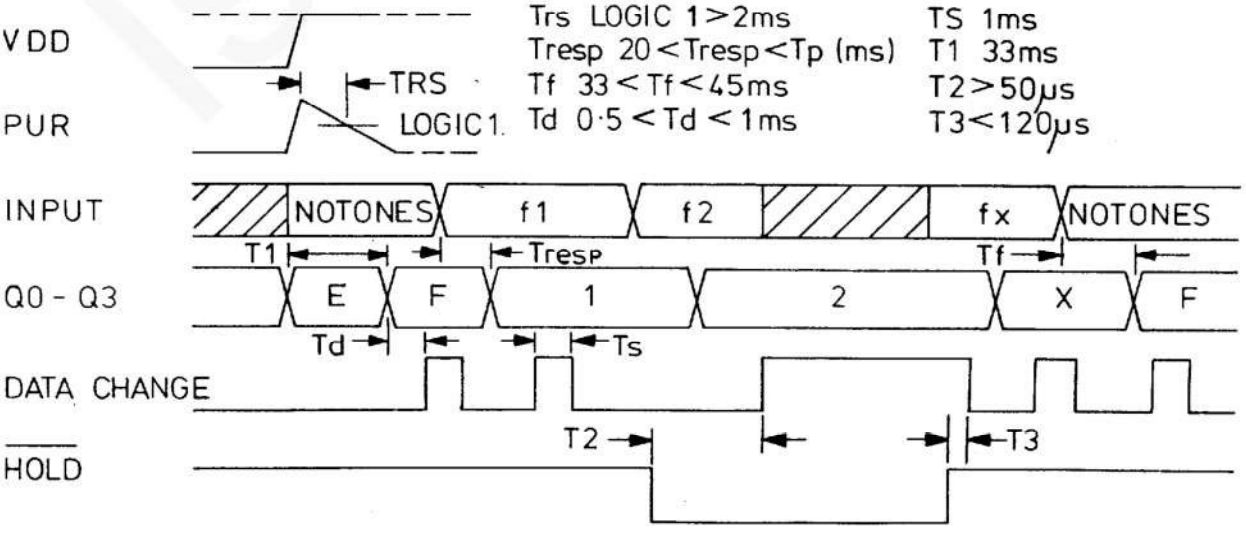
(1) With minimum tone period (Tp) specified for toneset. P=decode probability.
(2) With maximum Tp specified for toneset.
(3) Corresponds to 1-digit code falsing rate. $\overline{F}$=random single character.
(4) Delay from change of input (tone applied/removed) to change at Qo/Q3 outputs.
(5) Minimum tone gap required for "notone" recognition. Outputs=F after delay.

CHARACTER TONE TABLE

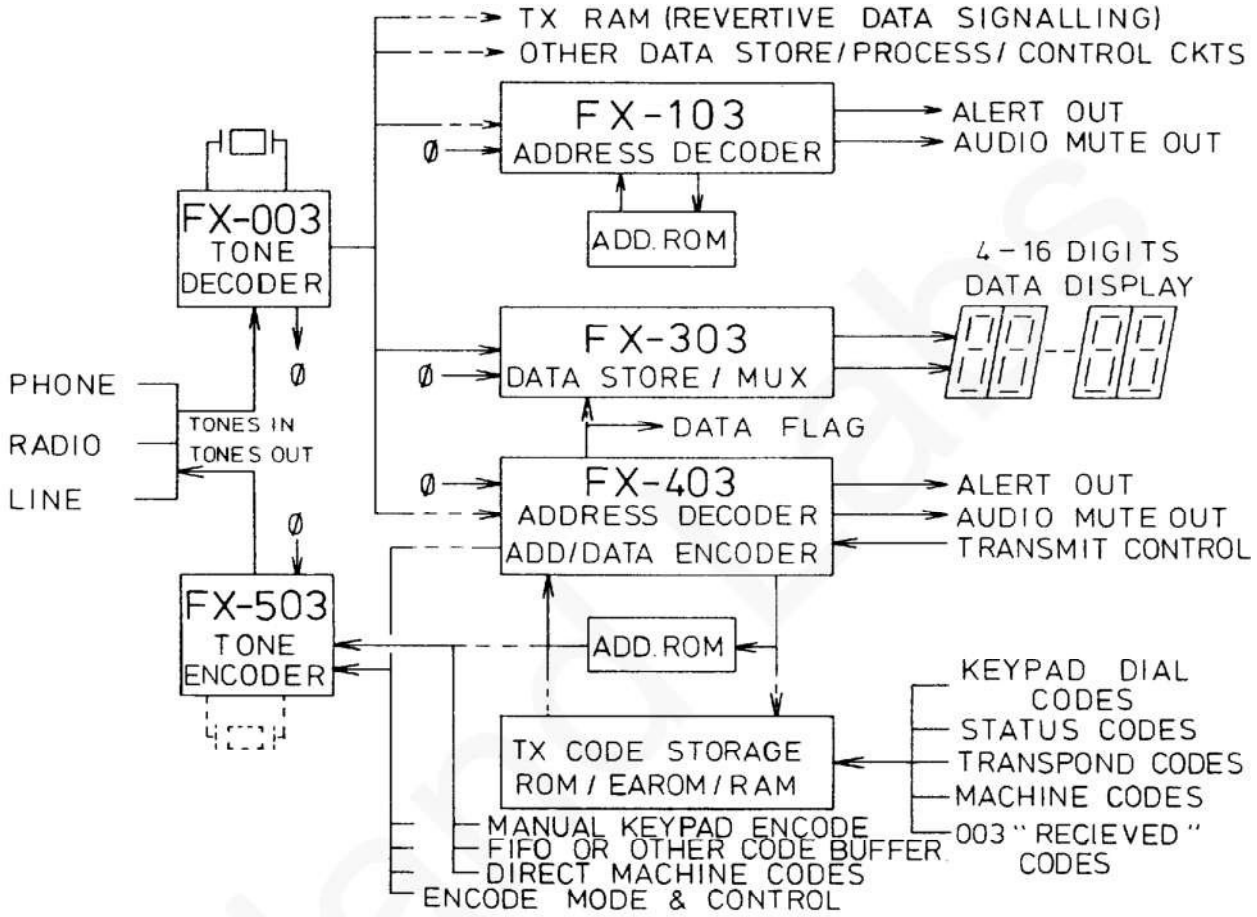
Tone Frequencies (f'o) in Hz				Output code				QTC format character
003-QA (EIA)	003-QC (CCIR)	003-QE (EEA)	003-QZ (ZVEI)	Q3	Q2	Q1	Qo	
600	1981	1981	2400	0	0	0	0	0
741	1124	1124	1060	0	0	0	1	1
882	1197	1197	1160	0	0	1	0	2
1023	1275	1275	1270	0	0	1	1	3
1164	1358	1358	1400	0	1	0	0	4
1305	1446	1446	1530	0	1	0	1	5
1446	1540	1540	1670	0	1	1	0	6
1587	1640	1640	1830	0	1	1	1	7
1728	1747	1747	2000	1	0	0	0	8
1869	1860	1860	2200	1	0	0	1	9
2151	2400	1055	2800	1	0	1	0	A
2433	930	930	810	1	0	1	1	B
2010	2247	2247	970	1	1	0	0	C
2292	991	991	886	1	1	0	1	D
459	2110	2110	2600	1	1	1	0	E
Notone	Notone	Notone	Notone	1	1	1	1	F

CIRCUIT CONNECTION & TIMING DIAGRAM





BLOCK FUNCTION OVERVIEW
"03" SERIES DEVICES FOR SELECTIVE SIGNALLING



DEVICE MIX	PRINCIPAL FUNCTIONS
003 + 103	1-5 digit address & group call decoder
003 + 303	1-16 digit address & data store/display MUX
003 + 303 + 403	1-6 digit address & group call decoder with 1-6 digit data storage & display MUX
003 + 403 + 503	1-6 digit address & group call decoder, 1-6 digit auto-transpond encoder and 1-14 digit address & data transmit encoder
003 + 403 + 503 + 303	As previous configuration plus 1-16 digits of data storage & display MUX
003 + 503	μP etc. controlled tone signalling, 4-bit parallel in-out "modem".

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