1 INTRODUCTION.

The TQ 804 is a programmable channel-guard encoder/decoder. It is based on switched-capacitor technology, where the center-frequency of a 2nd order BP-filter is changed by changing a clock-frequency. This clock-frequency is derived from a crystal by means of 2 4-bit dividers. Thus by changing the division ratio the BP-center frequency is changed.

2 PROGRAMMING THE TQ 804.

The TQ 804 can be programmed using either pull-up or pull-down resistors depending on whether the pull-up/pull-down selector is connected to supply (7.5V) or ground.
In any case in the following table a "1" means logic high and "0" is logic "low".

EIA-Tone (Hz)	Deletal	Bit weight 128	64	32	16	8	4	2	1
67	236	1	1	1	0	1	1	0	0
71.9	220	1	1	0	1	1	1	0	0
74.4	213	1	1	0	1	0	1	0	1
77	206	1	1	0	0	1	1	1	0
79.7	199	1	1	0	0	0	1	1	1
82.5	192	1	1	0	0	0	0	0	0
85.4	185	1	0	1	1	1	0	0	1
88.5	179	1	0	1	1	0	0	1	1
91.5	173	1	0	1	0	1	1	0	1
94.8	167	1	0	1	0	0	1	1	1
97.4	163	1	0	1	0	0	0	1	1
100	158	1	0	0	1	1	1	1	0
103.5	153	1	0	0	1	1	0	0	1
107.2	148	1	0	0	1	0	1	0	0
110.9	143	1	0	0	0	1	1	1	1
114.8	138	1	0	0	0	1	0	1	0
118.8	133	1	0	0	0	0	1	0	1
123.0	129	1	0	0	0	0	0	0	1
127.3	124	0	1	1	1	1	1	0	0
131.8	120	0	1	1	1	1	0	0	0
136.5	116	0	1	1	1	0	1	0	0
141.3	112	0	1	1	1	0	0	0	0
146.2	108	0	1	1	0	1	1	0	0
151.4	105	0	1	1	0	1	0	0	1
156.7	101	0	1	1	0	0	1	0	1
162.2	98	0	1	1	0	0	0	1	0
167.9	94	0	1	0	1	1	1	1	0
173.8	91	0	1	0	1	1	0	1	1
179.9	88	0	1	0	1	1	0	0	0
186.2	85	0	1	0	1	0	1	0	1
192.8	82	0	1	0	1	0	0	1	0
203.5	78	0	1	0	0	1	1	1	0
210.7	75	0	1	0	0	1	0	1	1
Bit weight		128	64	32	16	8	4	2	1
19M905438G1 pin no.		9	11	12	10	18	15	16	17

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REVISIONS

APPV	DATE	TITLE	PRINTS TO:
OHN	5/5-82	SPECIFICATION PROGRAMMING	9L30
			FIRST MADE FOR TQ 804
		MADE BY OHN	F.C.F.O. X 27702
		ISSUED 1982 MAY 10	Storno
			CONT. ON SHEET 4 SH. NO. 3 19J707396

BLANKET NR. 55.143

LEC.

3 APPENDIX.

Calculating out-of-range tones.

If for some special application a tone, which is not in the table is called for, the following formula applies.

$$D = \frac{153600}{9.69} \times \frac{1}{ftone} = \frac{15839.6}{ftone}$$

$$\text{Division rate} = \frac{\text{constant}}{\text{tone-freq}}$$

The result should be rounded to the nearest integer.

1 SCOPE.

This specification covers the description and test of 19M905442G1, which is a part of the pilot-tone unit TQ804. TQ804 is intended for use in CQP800.

2 DESCRIPTION.

2.1 Functional.

19M905442G1 contains 3 filters: 2 low-pass filters and 1 high-pass filter. The filters are used to either remove the speech or noise from the pilot-tone frequency-band or remove the pilot-tones from the voice frequency-band.

2.2 Circuit.

The two low-pass filters are 3rd order Chebyrkev 0.1dB ripple active filters using the Sallen-Key topology. As unity-gain amplifiers two transistors in the compound-topology are used.
The high-pass filter is 3rd order active notch followed by a 2nd order high-pass active filters. Again the topology is Sallen-Key with 2-transistor compound unity-gain amplifiers.

3 SPECIFICATION.

3.1 Interface.

Power supply		7.5V ± 0.15V
Current consumption	RX	0.5mA ± 0.2mA
	TX	3mA ± 0.5mA

REVISIONS

APPV	DATE	TITLE	PRINTS TO:
OHN	82 MAY 10	Specification Test	L30
			FIRST MADE FOR: TQ804
		MADE BY: OHN	F.C.F.O.: 19 M905442
		ISSUED: 1982 MAY 10	Storno
			19J707504 CONT. ON SHEET 3 SH. NO. 2

BLANKET NR. 55.143

LEC.

Output.

Filter 1. Output	Input at pin 1, output at pin 7:	
	1000Hz, 120mV input:	± 0.5dB
	200Hz, 2mV input:	< -40dB
	300Hz, 120mV input:	± 0.5dB
Filter 2. Output	Input pin 10, output at pin 14.	
	100Hz, 2V input:	± 0.5dB
	300Hz, 2V input:	< -9 dB
	1000Hz, 2V input:	< -40dB
Filter 3 Output	Input at pin 18, output at pin 16.	
	100Hz, 120mV input:	± 0.5dB
	300Hz, 120mV input:	< -9 dB
	1000Hz, 120mV input:	< -40dB

3.2 Mechanical

In accordance with the 800 build standard for hybrid thickfilm.

Substrate: 19 x 53.7mm2

3.3 Environmental

Temperature range:

Operating range:	-25deg.C to + 55deg.C
Functioning range:	-30deg.C to + 60deg.C

4 APPLICABLE DRAWINGS.

Parts list, assembly	19M905442
Circuit diagram	19M905445

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APPV	DATE	TITLE	PRINTS TO:
OHN	82 MAY 10	Specification Test	L30
			FIRST MADE FOR: TQ804
		MADE BY: OHN	F.C.F.O.
		ISSUED: 1982 MAY 10	Storno
			19J707504 CONT. ON SHEET 4 SH. NO. 3

BLANKET NR. 55.143 LEC.

5 TEST EQUIPMENT.

1	power-supply	0 - 10V
1	milliamperemeter range	0 - 10mA
1	resistor	47K ohm ± 5% 1/10W
1	resistor	1.5K ohm ± 5% 1/10W
1	tonegenerator Ro = 50 Ohm	0-10KHz 0.1 - 5V
1	AC voltmeter	0-10KHz -50dB re 0.1V
1	DC voltmeter.	
1	2-by3 switch.	

6 TEST SET-UP.

See Fig. 1 page 6.

7 TEST-PROCEDURE.

1. Set S1 in position 1.
Apply vi = 120mV and convert the output voltage to dB's relative to 120mV for the frequencies written in TABLE I.

FREQUENCY	V0
3KHz	± 0.5dB
2KHz	± 0.5dB
1KHz	± 0.5dB
500 Hz	± 1dB
300 Hz	± 1.5dB, -0.5dB
200 Hz	< -40dB
100 Hz	< -40dB

TABLE I

2. Set S1 in position 2 and S2 ON.
Apply vi = 1.8V. f = 100Hz. V0 (100Hz) = 0dB. Check V0 (100Hz) >1.1V. Check the frequency response according to TABLE II.

FREQUENCY	V0
60 Hz	± 1.5dB
200 Hz	> -2dB
300 Hz	< -8dB
500 Hz	- 20dB
-3kHz	< -38dB

TABLE II

Measure the DC voltage Vo: Vo = 3.0V ± 0.3V.

3. Set S1 in position 3.
Apply vi = 120mV and convert the output voltage to dB's relative to 120mV for the frequencies written in TABLE III

FREQUENCY	V0
60 Hz	± 1.5dB
100 Hz	± 1.5dB
200 Hz	+1, -2dB
300 Hz	< - 9dB
500 Hz	< -22dB
1KHz	< -40dB
3KHz	< -45dB

4. Set S2 ON. Read the current consumption: I < 5.5mA

5. Set S2 OFF. Read the current consumption: I < 0.5mA

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APPV	DATE	TITLE	PRINTS TO:
OHN	82 MAY 10	Specification Test	L30
			FIRST MADE FOR: TQ804
		MADE BY: OHN	F.C.F.O.
		ISSUED: 1982 MAY 10	Stornо
			CONT. ON SHEET 6 SH. NO. 5 19J707504

BLANKET NR. 55.143 LEC.

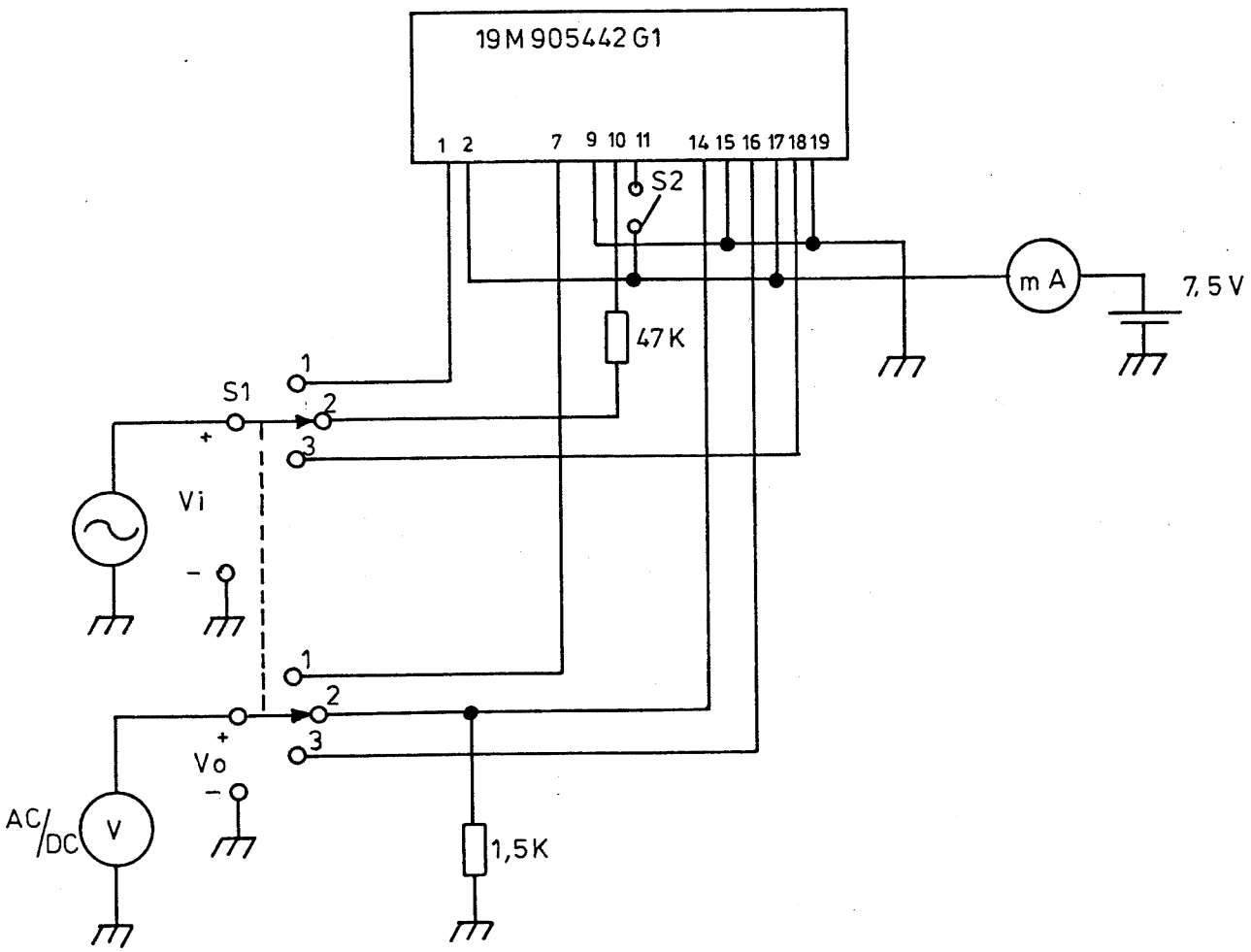

FIG. 1 TEST SET-UP

L 30

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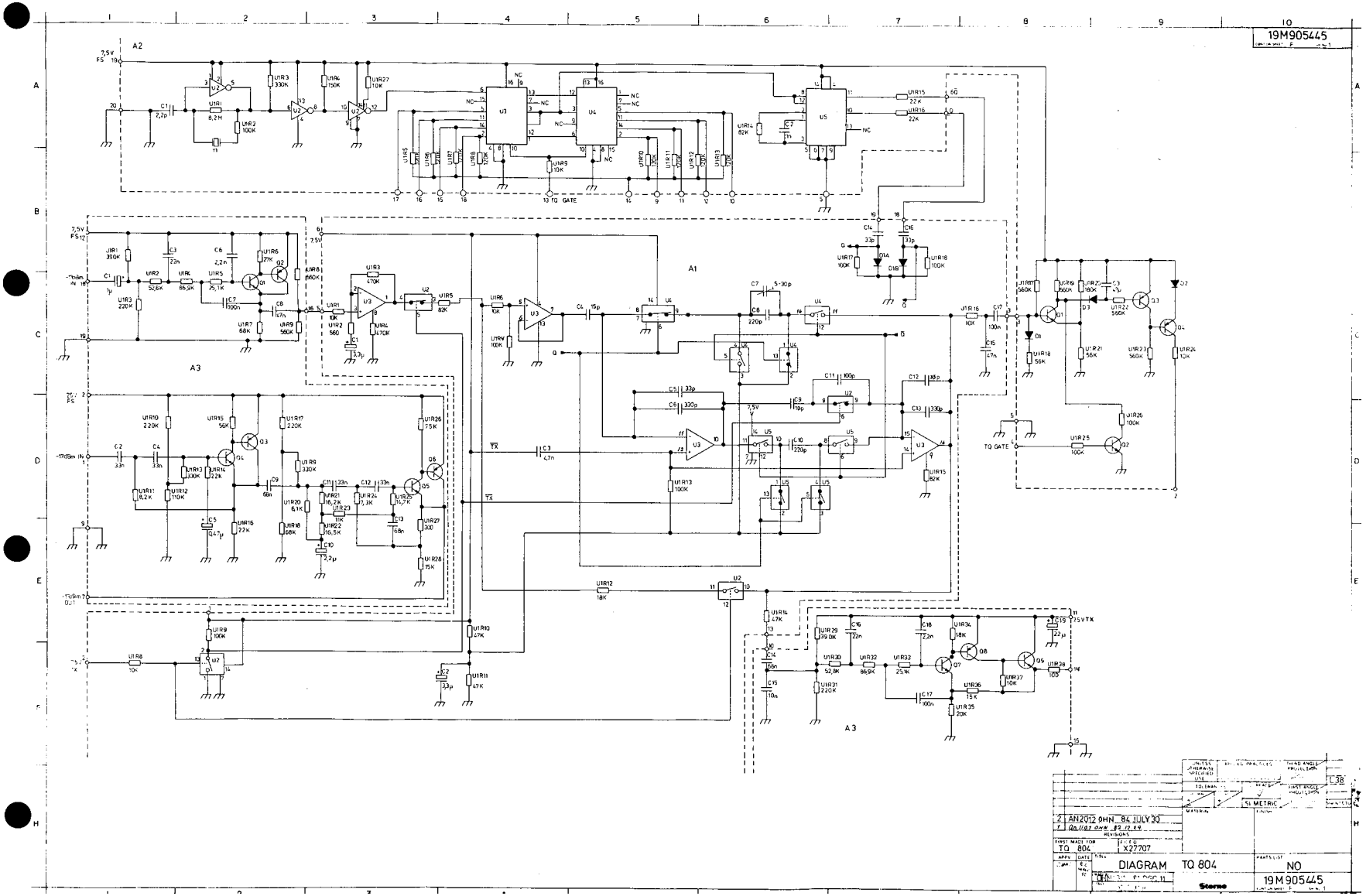
THIRD ANGLE PROJECTION | FIRST ANGLE PROJECTION | SI-METRIC | PRINTS TO

APPV	DATE	TITLE	FIRST MADE FOR TQ 804
OHN	82 MAY 10	SPECIFICATION TEST	F.C.F.O. 19 M 905442
		MADE BY OHN	19J707504
		ISSUED 1982 MAY 10	CONT ON SHEET F SH NO. 6

Storno


19M905445
A2
A1
A3
A3
TQ GATE
TQ 804
DIAGRAM
NO
19M905445
SI METRIC
Sterne