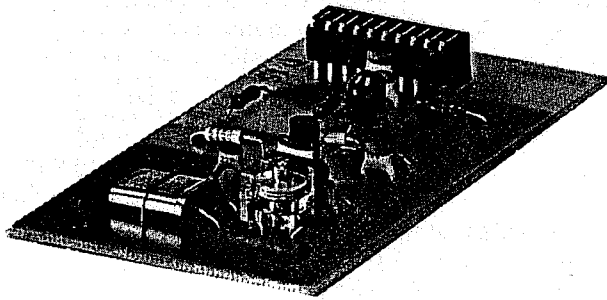
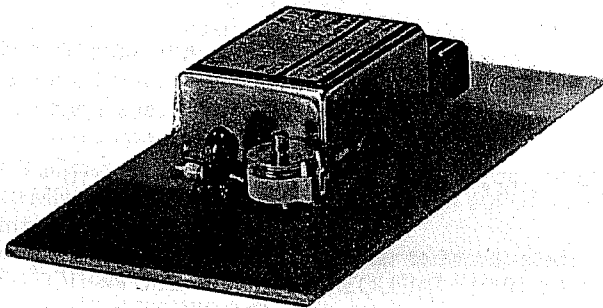


XI. OSCILLATORS PM 9677, PM 9678, PM 9679 and PM 9690



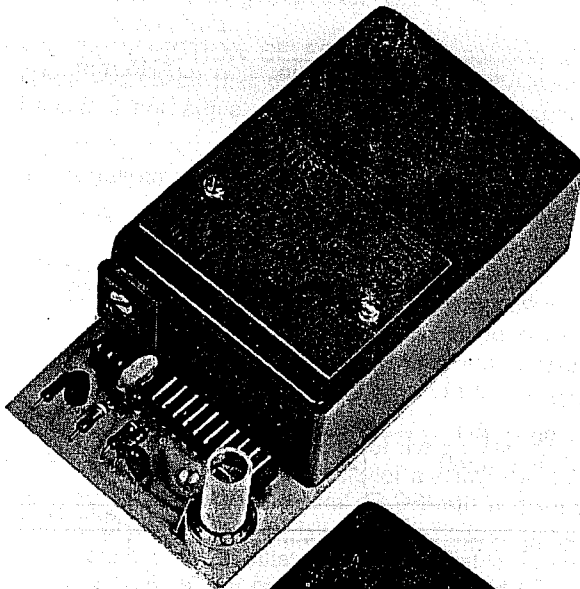
**PM 9677**

9446 096 770.1



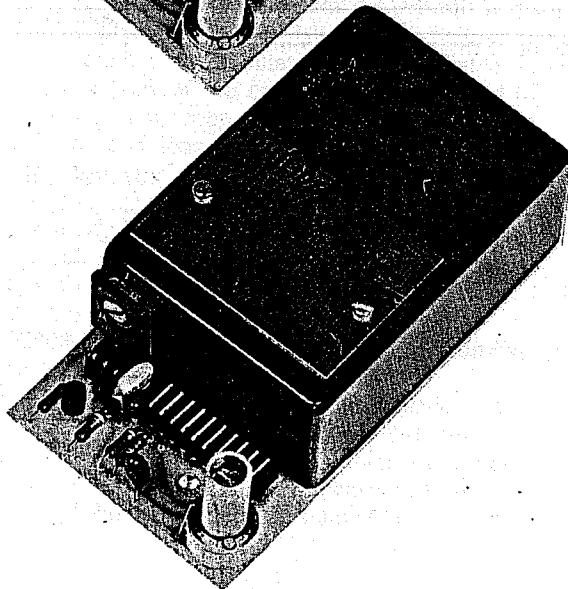
**PM 9678**

9446 096 780.1



**PM 9679**

9446 096 790.1



**PM 9690**

9446 096 900.1

## 1. General

The oscillators are made as plug-in cards and have a nominal frequency of 10 MHz.

## 2. Technical data

	PM 9677	PM 9678	PM 9679	PM 9690
<b>2.1. Electrical</b>				
Nominal frequency, MHz	10.000 000	10.000 000	10.000 000	10.000 000
Trimming range, Hz	> ± 200	> ± 20	+20*) -30	+3*) -7
Output voltage, mV (into 1 kohm)	> 300	> 100	> 150	> 50
Supply voltage, V	+ 12	+ 12	+ 11.5 to 28 (from unregulated power supply)	+ 11.5 to 28 (from unregulated power supply)
<b>Power consumption (+25°C)</b>				
Continuous operation	< 100 mW	< 200 mW	< 100 mA	< 125 mA
Stand by	none	none	< 100 mA	< 125 mA
Warm up	none	none	< 400 mA	< 400 mA
<b>Stability against:</b>				
Ageing	< 5 × 10 <sup>-7</sup> /month	< 1 × 10 <sup>-7</sup> /month**)	< 1 × 10 <sup>-7</sup> /month	< 1.5 × 10 <sup>-9</sup> /24 h (after 72 hours of continuous operation)
Temperature 0... 50°C (ref. to +25°C)	< 1 × 10 <sup>-5</sup>	< 1 × 10 <sup>-6</sup>	< 1 × 10 <sup>-7</sup>	< 3 × 10 <sup>-8</sup>
Line voltage ± 10 %	< 1 × 10 <sup>-8</sup>	< 1 × 10 <sup>-9</sup>	< 1 × 10 <sup>-9</sup>	< 5 × 10 <sup>-10</sup>
Change of measuring mode and change between line, ext. and int. battery	< 3 × 10 <sup>-7</sup>	< 5 × 10 <sup>-8</sup>	< 1 × 10 <sup>-8</sup>	< 3 × 10 <sup>-9</sup>
Warm up time (to reach 1 × 10 <sup>-7</sup> )			< 10 min	< 15 min
<b>2.2. Environmental</b>				
<b>Temperature</b>				
Storage, °C	-40 to +70	-40 to +70	-40 to +70	-40 to +70
Operating, °C	0 to +50	0 to +50	0 to +50	0 to +50
<b>Altitude</b>				
Storage, m	15000	15000	15000	15000
Operating, m	5000	5000	5000	5000
<b>Humidity at 50°C</b>				
	10—90 % RH (26° dew point)	10—90 % RH (26° dew point)	10—90 % RH (26° dew point)	10—90 % (26° dew point)
Shock	Meets the requirement of the IEC Eb recommendations			} all oscillators
Vibration	Meets the requirement of the IEC 68F recommendations			
<b>2.3. Mechanical</b>				
Dimensions, mm	93 × 50 × 20	93 × 50 × 15	100 × 52 × 35	100 × 52 × 35
Weight, g	50	25	100	100

\*) The indicated values regard only the fine trimming range. A coarse trimmer is available on the PM 9679 and PM 9690 to adjust for an ageing of more than 10 years.

\*\*\*) Trimming range will cover at least 10 years of operation since the ageing will decrease substantially after the first 6 months.

### 3. Frequency adjustment PM 9677

- 3.1. This adjustment requires a reference oscillator having an accuracy of  $\leq 1 \times 10^{-6}$ . The oven enclosed PHILIPS oscillators PM 9680\*, PM 9681\* and PM 9690\* meet this requirement. The adjustment should preferably be made at an ambient temperature of  $+25^{\circ}\text{C}$ .
- 3.2. Remove the bottom cover of the counter.
- 3.3. Connect the reference signal available at socket 10 MHz OUT of the external counter to INPUT A of the counter to be adjusted.
- 3.4. Set the controls of the counter to be adjusted:  
FUNCTION SELECTOR **⑩**: FREQUENCY 1 Hz (1s)  
TRIGGER SELECTOR **⑦** : depressed
- 3.5. Adjust trimming capacitor C 1 to 10000.000 kHz plus or minus 10 Hz.

### 4. Frequency adjustment PM 9678

- 4.1. This adjustment requires a reference oscillator having an accuracy of  $\leq 1 \times 10^{-7}$ . The oven enclosed PHILIPS oscillator PM 9680\*, PM 9681\* and PM 9690\* meet this requirement. The adjustment should preferably be made at an ambient temperature of  $+25^{\circ}\text{C}$ .
- 4.2. Remove the bottom cover of the counter.
- 4.3. Connect the reference signal available at socket 10 MHz OUT of the external counter to INPUT A of the counter to be adjusted.
- 4.4. Set the controls of the counter to be adjusted:  
FUNCTION SELECTOR **⑩**: FREQUENCY 1 Hz (1s)  
TRIGGER SELECTOR **⑦** : depressed.
- 4.5. Adjust trimming capacitor C 1 to 10000.000 kHz plus or minus 1 Hz.
- 4.6. Set FUNCTION SELECTOR **⑩** to position 0.1 Hz (10s) and check that display read-out is the same as before. If not, adjust C 1 slightly to correct frequency.

### 5. Frequency adjustment PM 9679

- 5.1. This adjustment requires a reference oscillator having an accuracy of  $\leq 3 \times 10^{-8}$ . The oven enclosed PHILIPS oscillators PM 9680\*, PM 9681\* and PM 9690\* meet this requirement. The adjustment should preferably be made at an ambient temperature of  $25^{\circ}\text{C}$  and the oscillator must have been operating continuously 72 h before any adjustment is made.
- 5.2. Remove the bottom cover of the counter.
- 5.3. Connect the reference signal available at socket 10 MHz OUT of the external counter to socket EXT. TRIGG of oscilloscope PHILIPS PM 3250 or PM 3400.
- 5.4. Connect the oscillator signal available at socket 10 MHz OUT of the counter to be adjusted to INPUT A of the oscilloscope.
- 5.5. Set oscilloscope to 100 ns/div and adjust trimming potentiometer R 208 until waveform moves with a velocity of maximum 1 div./3 s (0.3 Hz). If the adjustment range of R 208 is too narrow perform the following steps 5.6 to 5.12.
- 5.6. Set trimming potentiometer R 208 to fully clockwise position.
- 5.7. Remove the two screws fixing the oscillator's text plate to the box.
- 5.8. Remove the small plastic cylinder beneath the text plate using a pair of tweezers.
- 5.9. Connect an external counter to socket 10 MHz OUT at the rear panel of the counter to be adjusted.
- 5.10. Adjust trimming capacitor C 108 until the display

- read out of the external counter is 10000020 Hz.
- 5.11. Refit the plastic cylinder and the text plate.
- 5.12. Perform steps 5.3 to 5.5.

### 6. Frequency adjustment PM 9690

- 6.1. This adjustment requires a reference frequency having an accuracy of  $\leq 1 \times 10^{-9}$ . Hewlett-Packard quartz frequency standard HP 105\* meets this requirement. The adjustment should preferably be made at an ambient temperature of  $25^{\circ}\text{C}$  and the oscillator must have been operating continuously 72 h before any adjustment is made.
- 6.2. Remove the bottom cover of the counter.
- 6.3. Connect any of the three reference signals available at sockets 5 MHz, 1 MHz and 100 kHz of the HP 105 to socket EXT. TRIGG of oscilloscope PHILIPS PM 3250 or PM 3400.
- 6.4. Connect the oscillator signal available at socket 10 MHz OUT of the counter to be adjusted to INPUT A of the oscilloscope.
- 6.5. Set oscilloscope to 100 ns/div and adjust trimming potentiometer R 208 until waveform moves with a velocity of maximum 1 div/10 s (0.1 Hz). If the adjustment range of R 208 is too narrow perform the following steps 6.6 to 6.12.
- 6.6. Set trimming potentiometer R 208 to fully clockwise position.
- 6.7. Remove the two screws fixing the oscillator's text plate to the box.
- 6.8. Remove the small plastic cylinder beneath the text plate using a pair of tweezers.
- 6.9. Connect an external counter to socket 10 MHz OUT at the rear panel of the counter to be adjusted.
- 6.10. Adjust trimming capacitor C 108 until the display read out of the external counter is 10000003 Hz.
- 6.11. Refit the plastic cylinder and the text plate.
- 6.12. Perform steps 6.3 to 6.5.

### 7. Repair of oscillator PM 9679 and PM 9690

- 7.1. Repair of these oscillators may not be carried out by the local service organisations. In case of breakdown the complete sealed oscillator box has to be sent to the factory for repair.

Factory address:

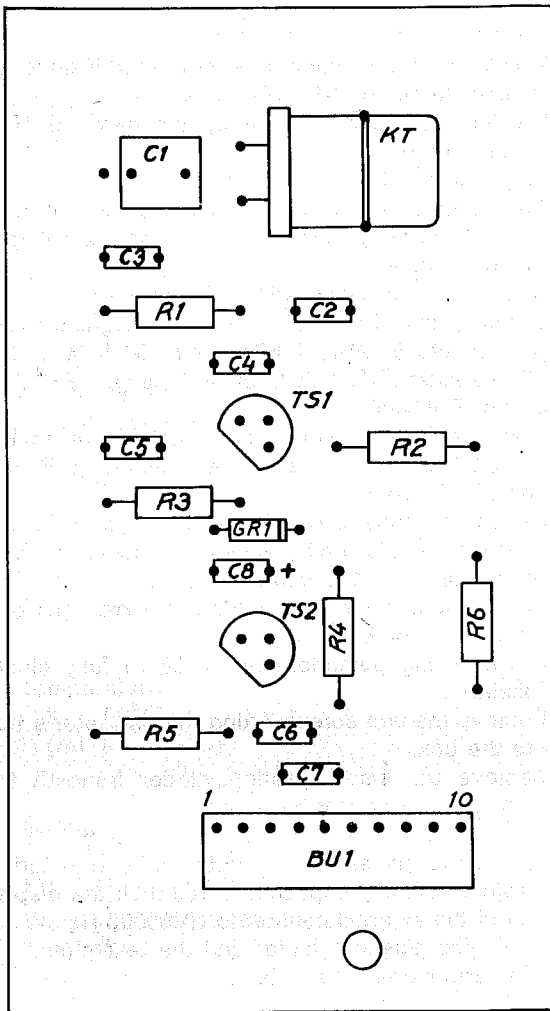
PHILIPS ELEKTRONIKINDUSTRIER AB  
INDUSTRIAL OPERATIONS  
FACK  
S-175 20 JÄRFÄLLA  
SWEDEN

### 8. Pin configuration

	PM 9677	PM 9678	PM 9679	PM 9690
Pin				
1				
2				
3				
4			+ 11 ... 25 V + 11 ... 25 V	
5	10 MHz out	10 MHz out	10 MHz out	10 MHz out
7	+ 12 V	+ 12 V		

\*To be checked against a frequency standard such as Droitwich or HBG.

9. Circuit diagram, component lay-out and spare parts list PM 9677



4822	110	63161
4822	110	63116
4822	110	63107
4822	110	63107
4822	110	63107
4822	110	63107

5322	125	54029
4822	122	31063
4822	122	31072
4822	122	31076
5322	122	34041
5322	122	34041
5322	122	34041
5322	122	34041
5322	124	14036

5322	130	44418
5322	130	44418
5322	130	30766

5322	242	74036
5322	267	64031

Spare parts PM 9677

RESISTORS

100K	5	CR25	R1
2.2K	5	CR25	R2
1K	5	CR25	R3
1K	5	CR25	R4
1K	5	CR25	R5
1K	5	CR25	R6

CAPACITORS

2=18P	300	C1	
22P	2	100	C2
47P	2	100	C3
68P	2	100	C4
10N	=20+50	100	C5
10N	=20+50	100	C6
10N	=20+50	100	C7
15M	=10+50	16	C8

SEMI CONDUCTORS

BF 256 A	TS1
BF 256 A	TS2
BZX79=C6V2	GR1

MISCELLANEOUS  
CRYSTAL 10MHZ  
CONNECTOR

BU1

Figure XI-1. Component lay-out PM 9677

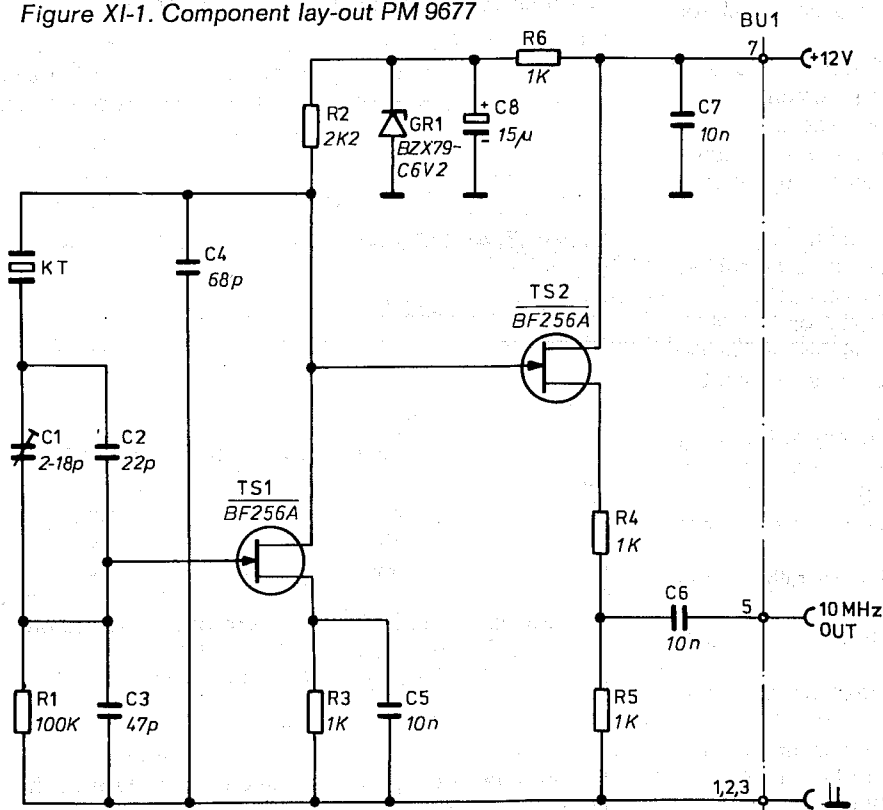


Figure XI-2. Circuit diagram PM 9677

## 10. Circuit diagram, component lay-out and spare parts list PM 9678

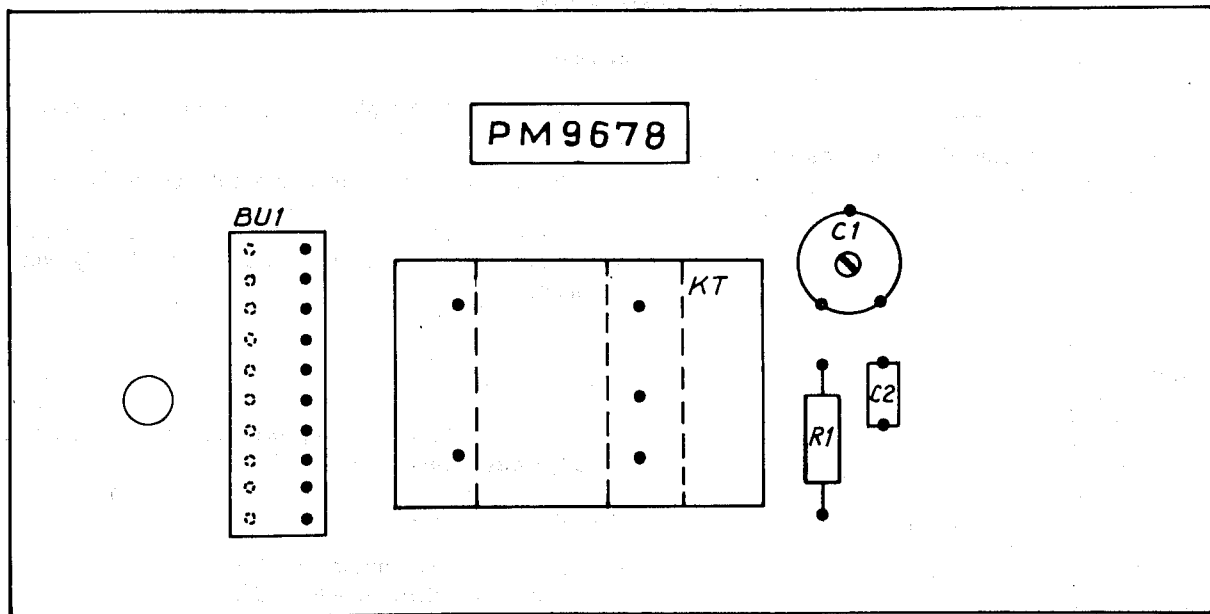


Figure XI-3. Component lay-out PM 9678

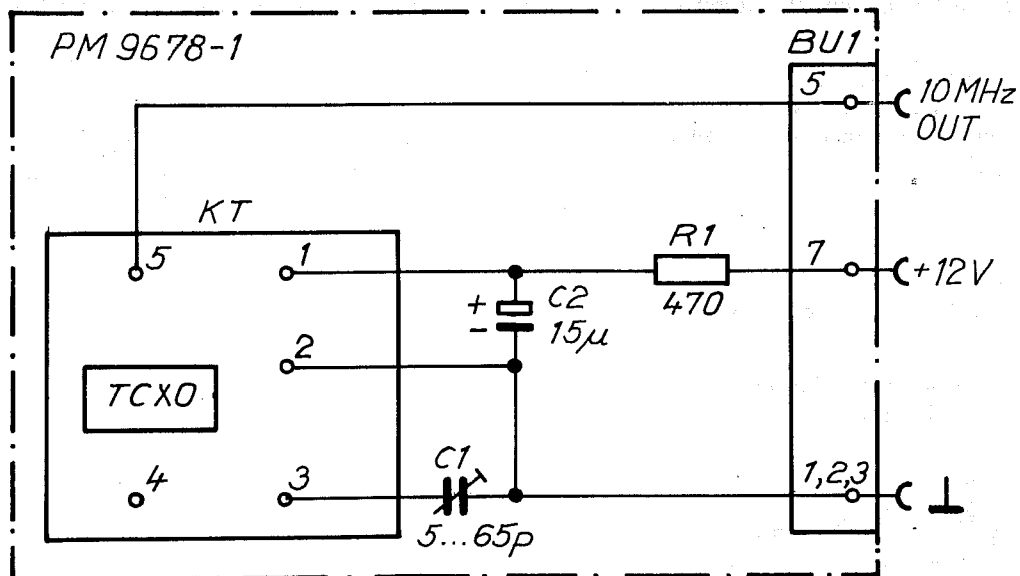


Figure XI-4. Circuit diagram PM 9678

## ORDERING NUMBER

4822 110 63098	470 $\Omega$ 5 %	R 1
5322 125 50057	5-65 P	100 V C 1
5322 124 14036	15 M -10 +50 %	16 V C 2
5322 267 64031	Connector	BU 1
5322 216 94047	Crystal 10 MHz	

Spare parts PM 9678