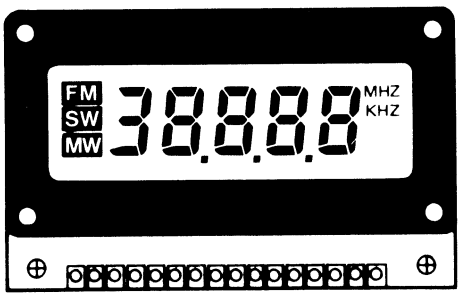
pci INCORPORATED

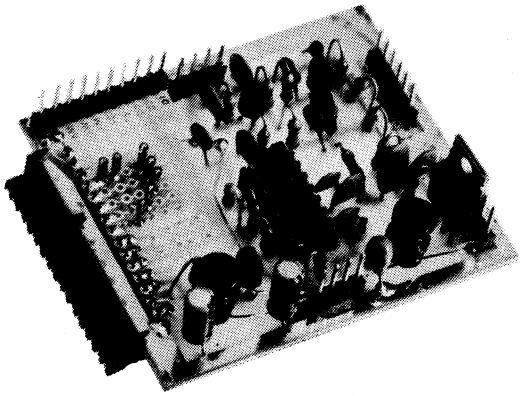
MODEL 177 FREQUENCY COUNTER

LCD DIGITAL COUNTER MODULE

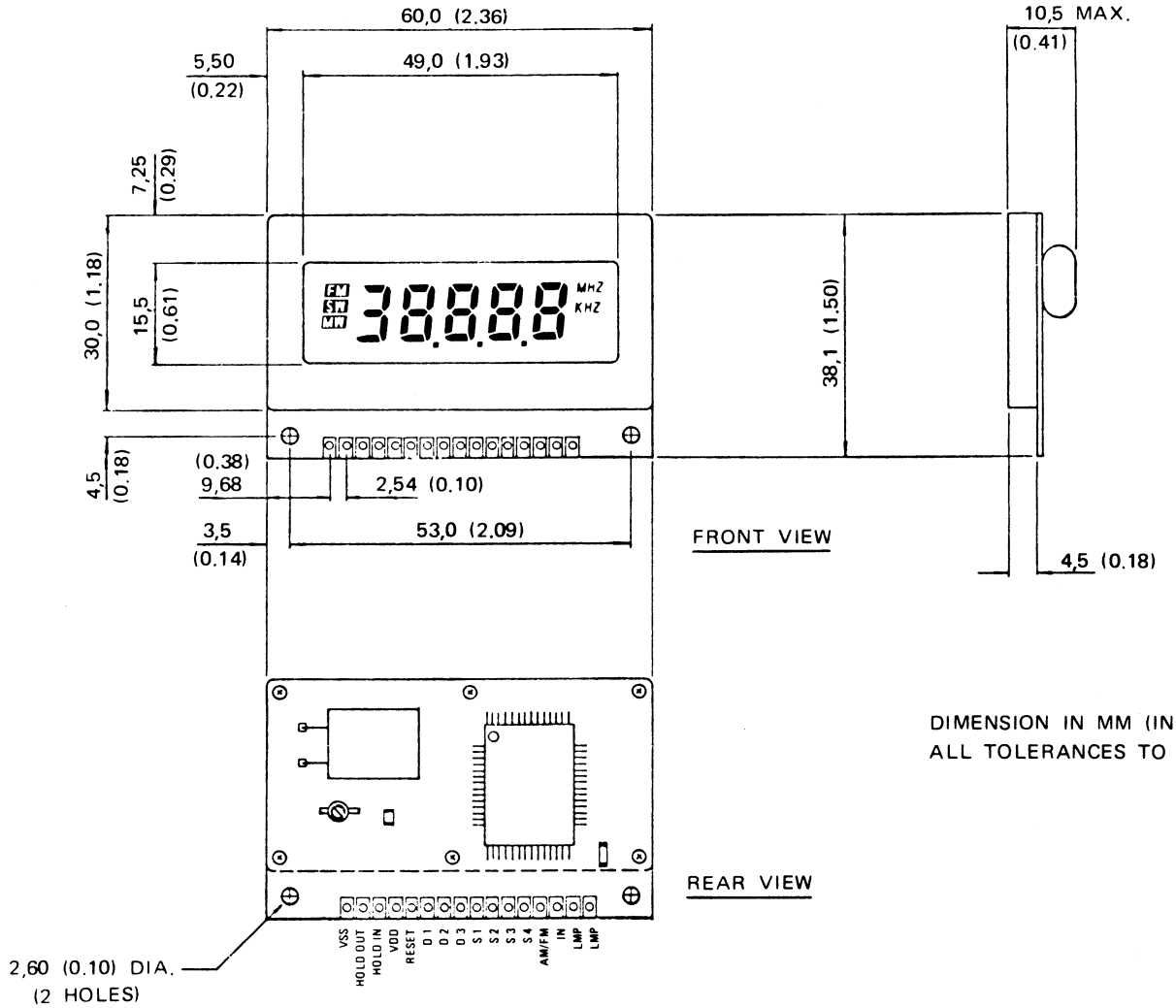


FEATURES

- 4½ digit display.
- 9mm LCD display character height.
- FM, SW, MW, MHz and KHz indications.
- Intermediate Frequency Offset.
  LW and MW : 6 levels (−470, −468, −455, −450, −261 and −260 KHz)
  SW : 4 levels (−10700, −2000, −468 and −455 KHz)
  FM : 16 levels (between −10.78 and +10.77 MHz)
- Ordinary Frequency Counter and counter only are available.
- Holding of display content capability.
- Reset of frequency counter and counter are available.
- Lamp back lighting.
- Compact and easy mounting design for radio set.



MODULE DIMENSIONS



DIMENSION IN MM (INCH)
ALL TOLERANCES TO BE ±0,1 (0.004)

TERMINAL FUNCTIONS

VDD : Positive terminal for module power supply.

VSS : Negative terminal for module power supply.

HOLD IN : A terminal to hold the display content. Once the terminal level is "H", the counter content is held within 300ms and the display is fixed for any input frequency. When the terminal is "L", display returns to normal operation.

HOLD OUT : A terminal to reduce power consumption by turning OFF prescaler; the level goes from "H" to "L" within 300ms after HOLD IN terminal level goes from "L" to "H".

RESET : A terminal while is turned from "L" to "H", will function to;

either a) check the content of Intermediate Frequency OFFSET ROM (Read Only Memory) during AM and FM mode operations;

or b) reset the counter while in ordinary Frequency counter or in counter mode.

AM/FM, S1, S2, S3, S4 : The combinations of connecting these terminals to "H" or "L" will give the desired operation mode and Intermediate Frequency Offset. For detail, see Display Format.

D1, D2, D3 : These terminals are for display format selection (see Note 2).

INPUT : A terminal to input the local oscillator signals of a radio set.

No prescaler is required for LW and MW, but an externally provided 1/10 and 1/100 prescaler is required for SW and FM respectively.

LMP : Two terminals are provided for lamp of display, 5-volt supply for the lamp.

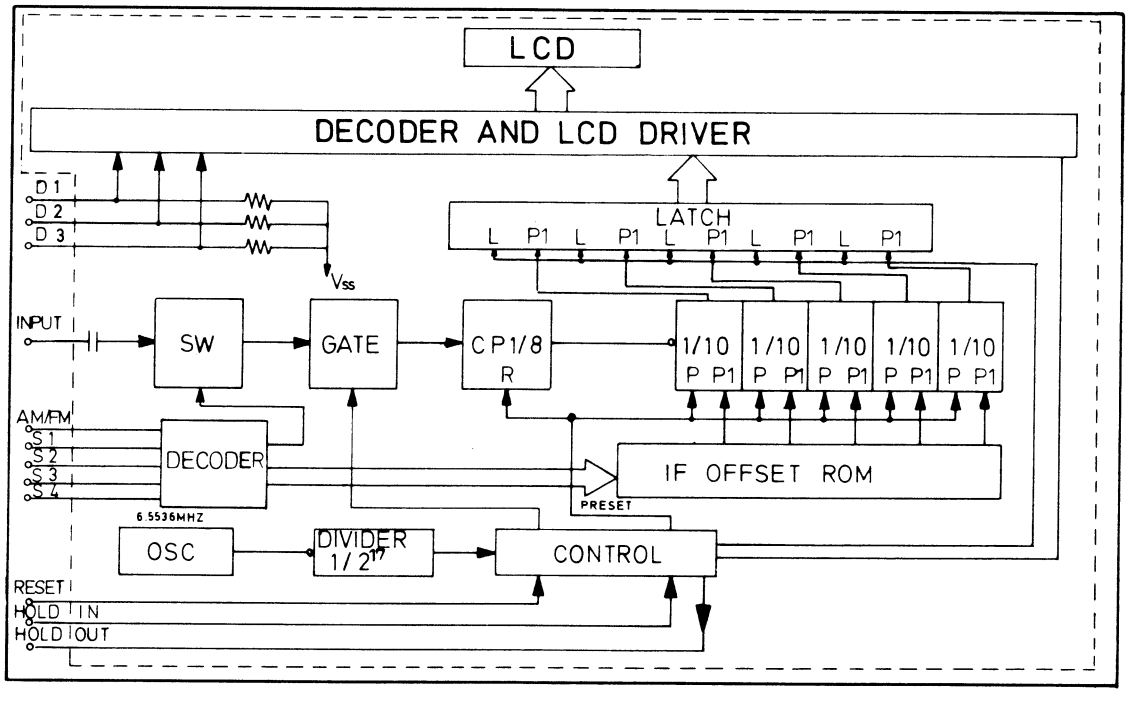
Note : 1 "H" = VDD, "L" = VSS or open

Note : 2

SELECT TERMINALS			DISPLAY CONTENTS
D1	D2	D3	
L	L	L	Normal display
H	L	L	1) The last two digits display 0 for AM or SW 2) 2nd last digit displays 1, 3, 5, 7 and 9 with the last digit displaying 0 for FM
L	H	L	The last digit displays 0
L	L	H	DISPLAY WITHOUT LEGENDS *

*Ordinary counter mode

CIRCUIT BLOCK DIAGRAM OF THE MODULE



DISPLAY FORMAT

DISPLAY MODE	EXAMPLE OF DIGITAL DISPLAY	SELECT INPUT					IF OFFSET VALUES	UNIT
		AM/FM	S1	S2	S3	S4		
MW (0.0–3999.9)	MW 1222 KHZ	H	L	L	L	L	−455	KHz
		H	L	H	L	L	−260	
		H	L	L	H	L	−450	
		H	L	H	H	L	−261	
		H	L	L	L	H	−468	
		H	L	H	L	H	−470	
SW (00.000–39.999)	SW 12.555 MHZ	H	H	L	L	L	−0.455	MHz
		H	H	H	L	L	−0.468	
		H	H	L	H	L	−2.0	
		H	H	H	H	L	−10.7	
FM (0.00–399.99)	FM 92.88 MHZ	L	L	L	L	L	+10.7	MHz
		L	H	L	L	L	+10.63	
		L	L	H	L	L	−10.7	
		L	H	H	L	L	+10.66	
		L	L	L	H	L	+10.74	
		L	H	L	H	L	+10.77	
		L	L	H	H	L	−10.63	
		L	H	H	H	L	−10.65	
		L	L	L	L	H	−10.66	
		L	H	L	L	H	−10.67	
		L	L	H	L	H	−10.68	
		L	H	H	L	H	−10.71	
		L	L	L	H	H	−10.74	
		L	H	L	H	H	−10.75	
		L	L	H	H	H	−10.77	
		L	H	H	H	H	−10.78	
F.C.* (0.0–3999.9)	MW 1222 KHZ	H	L	L	H	H	–	KHz
Counter (0–39999)	10800	H	L	H	H	H	–	–

*F.C. – Ordinary Frequency counter

OPERATING SPECIFICATION

Operating Voltage, referenced to VSS	5V
Operating Temperature	0 to 50° C
Storage Temperature	−10 to 60° C

ELECTRICAL CHARACTERISTICS

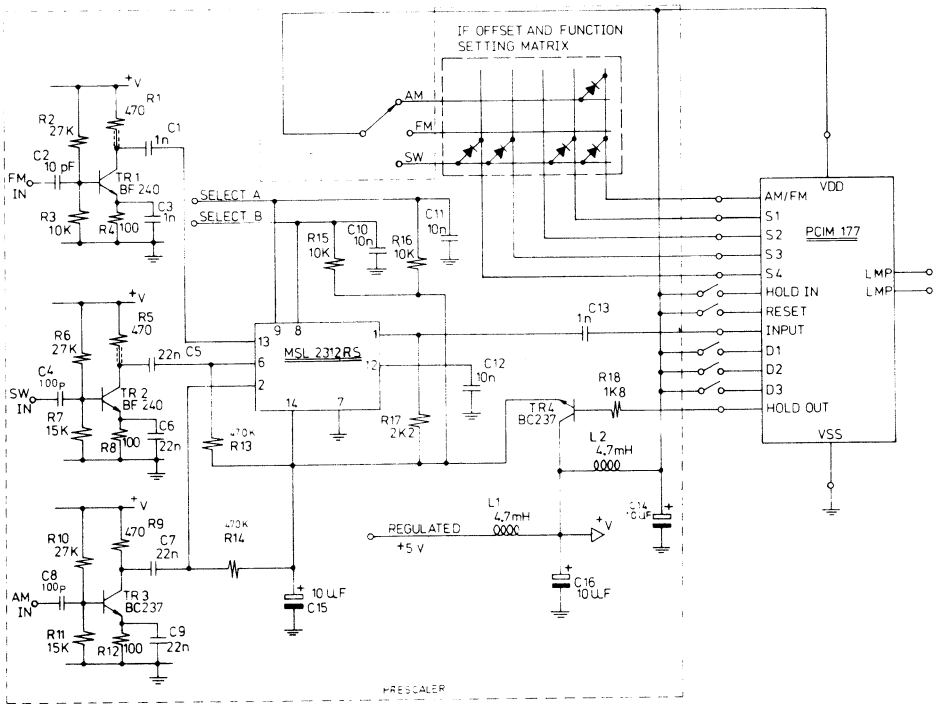
TA = 25° C

PARAMETER	TEST CONDITION	LIMIT			UNIT
		MIN.	TYP.	MAX.	
Power supply voltage	–	4.75	–	7.0	V
High level input voltage	–	3.6	–	–	V
Low level input voltage	–	–	–	0.8	V
High level output voltage	Io = −15 μA* Io = −40 μA†	4.2 4.2	– –	– –	V
Low level output voltage	Io = 15 μA* Io = 1.6mA†	– –	– –	0.2 0.4	V
High level output current	Vo = 5V* Vo = 2.5V†	0.2 −0.2	– –	– –	mA
Low level output current	Vo = OV* Vo = 0.4V†	−0.2 1.6	– –	– –	mA
Dynamic current consumption	f = 6.5536MHz, no load	–	–	4	mA

* : Applied to output terminals other than HOLD OUT

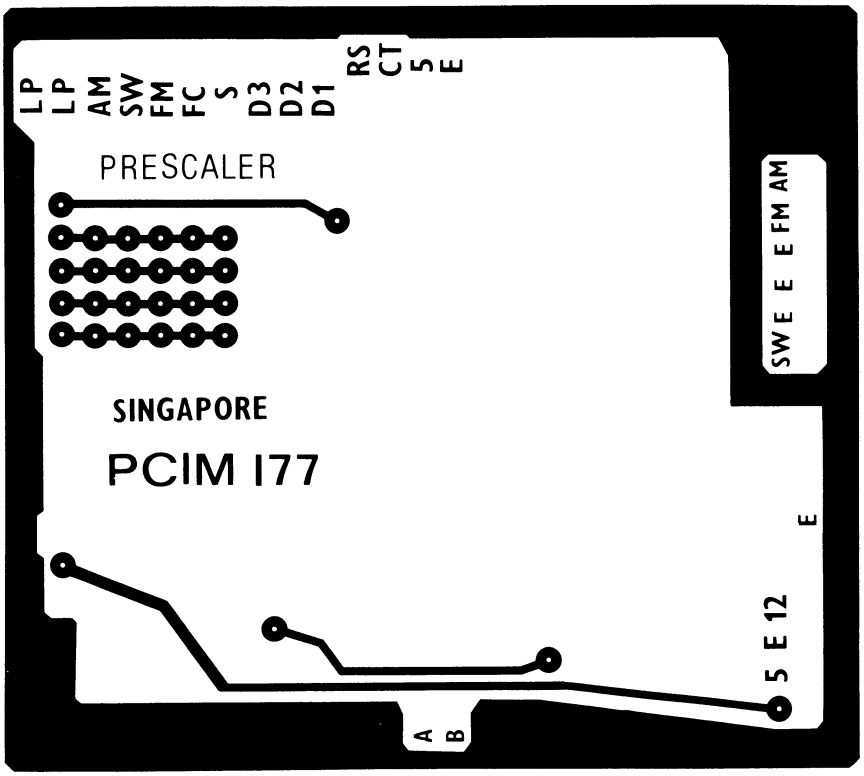
† : Applied to HOLD OUT

EXAMPLE OF FREQUENCY COUNTER MODE CONNECTION

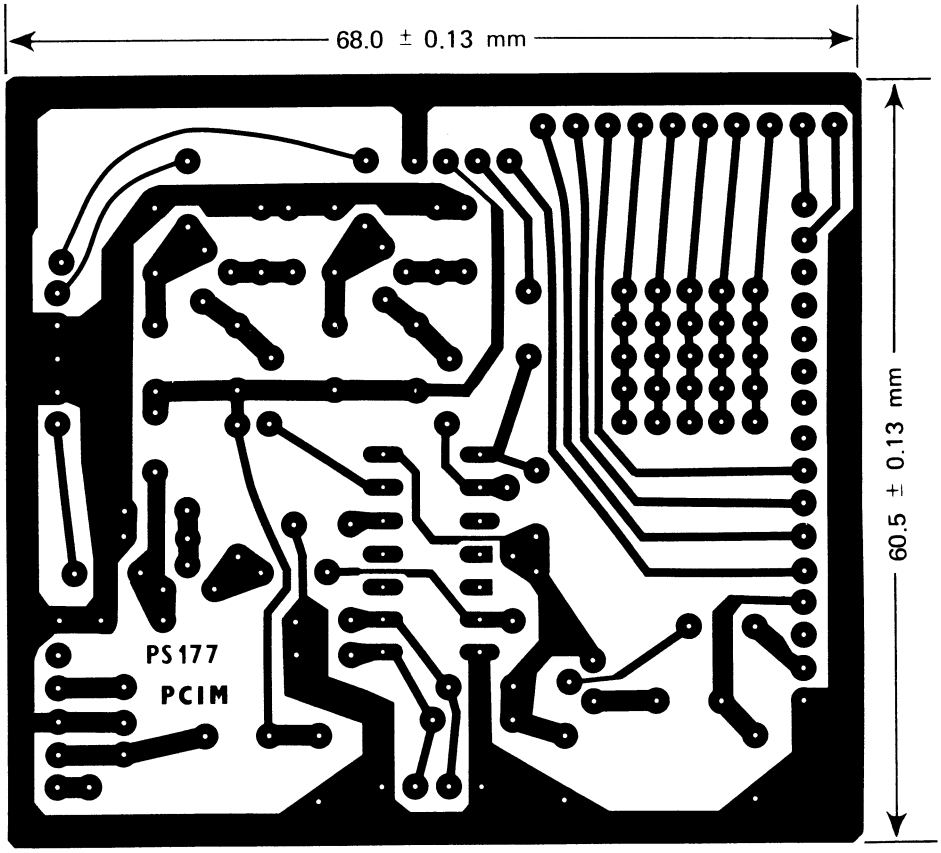


PRESCALER

PRINTED CIRCUITS BOARD OF THE PRESCALER

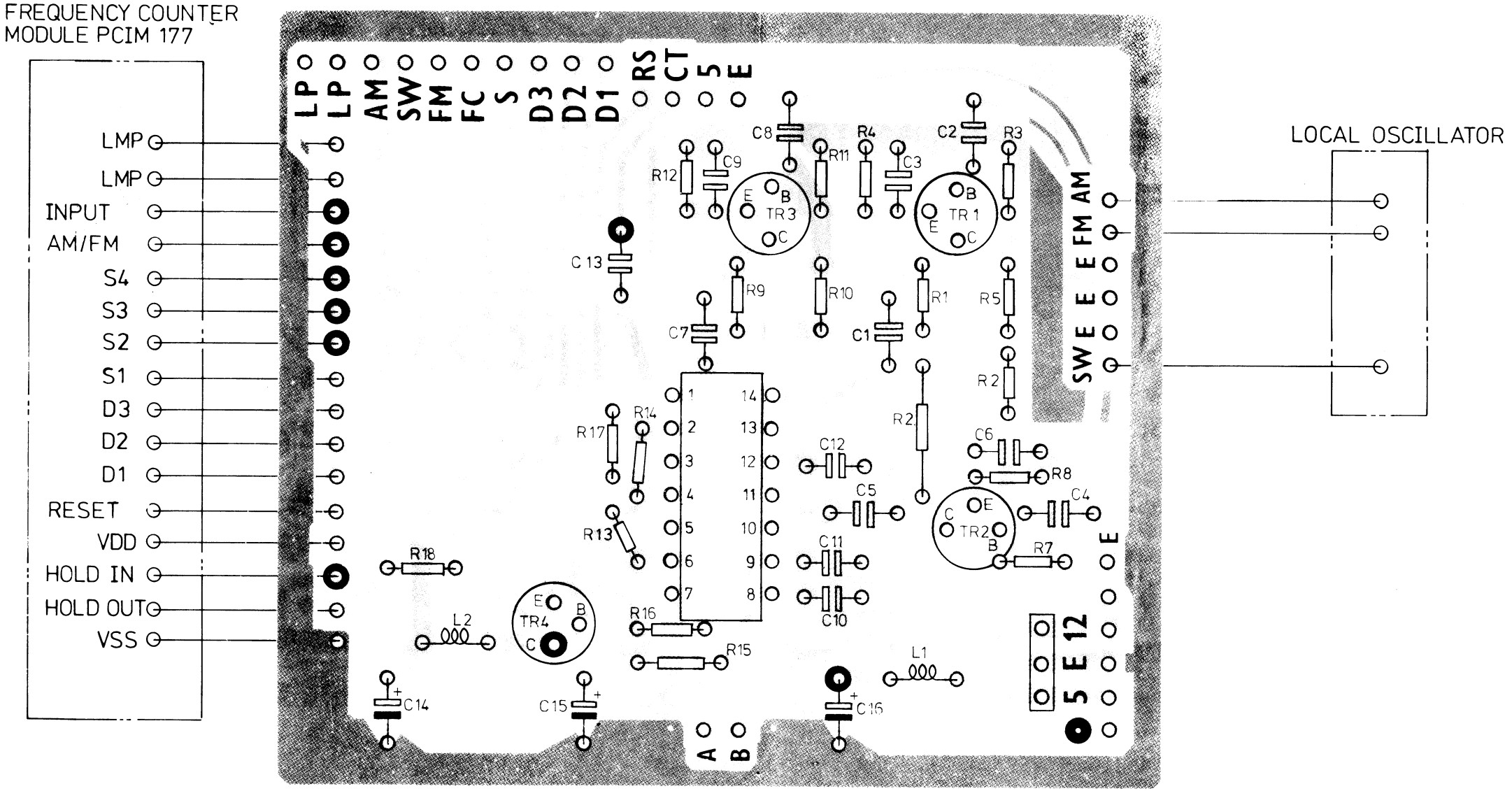


FRONT



REAR

COMPONENT LAYOUT OF THE PRESCALER FOR PCIM 177 FREQUENCY COUNTER



REF. DESIGNATORS	PART DESCRIPTION	MANUFACTURERS' PART NO./ CATALOGUE NO.	QUANTITY
R1, R5, R9	Resistor, Carbon film, ¼W, 5%, 470	271–308	3
R2, R6, R10	Resistor, Carbon film, ¼W, 5%, 27K	"	3
R3, R15, R16	Resistor, Carbon film, ¼W, 5% 10K	"	3
R4, R8, R12	Resistor, Carbon film, ¼W, 5%, 100	"	3
R7, R11	Resistor, Carbon film, ¼W, 5%, 15K	"	2
R13, R14	Resistor, carbon film, ¼W, 470K	"	2
R17	Resistor, Carbon film, ¼W, 5%, 2K2	"	1
R18	Resistor, Carbon film, ¼W, 1K8	"	1
C1, C3, C13	Disc Capacitor, Ceramic, 1nF, 12Vdc, 10%	272 – 801	3
C2	Disc Capacitor, Ceramic, 10pF, 12Vdc, 10%	"	1
C4, C8	Disc Capacitor, Ceramic, 100p, 12Vdc, 10%	"	2
C5, C6, C7, C9	Disc Capacitor, Ceramic, 22nF, 12Vdc, 10%	"	4
C10, C11, C12	Disc Capacitor, Ceramic, 10nF, 12Vdc, 10%	"	3
C14, C15, C16	Capacitor, tantalum, 10 µF, 16Vdc, 10%	"	3
L1, L2	Inductor coil, 4.7mH, 10%	273–1570	2
Diode	Small Signal Switching Diode, Silicon	1N914, 1N4148	As Required
TR1, TR2	RF Transistor, Silicon, NPN	BF 240	2
TR3, TR4	Transistor, Silicon, NPN	BC 237	2
I.C.	Prescaler	MSL 2312 RS from OKI	1

Note: Catalogue Numbers of Resistors, Capacitors and Inductors are referred from "RADIO-SHACK".

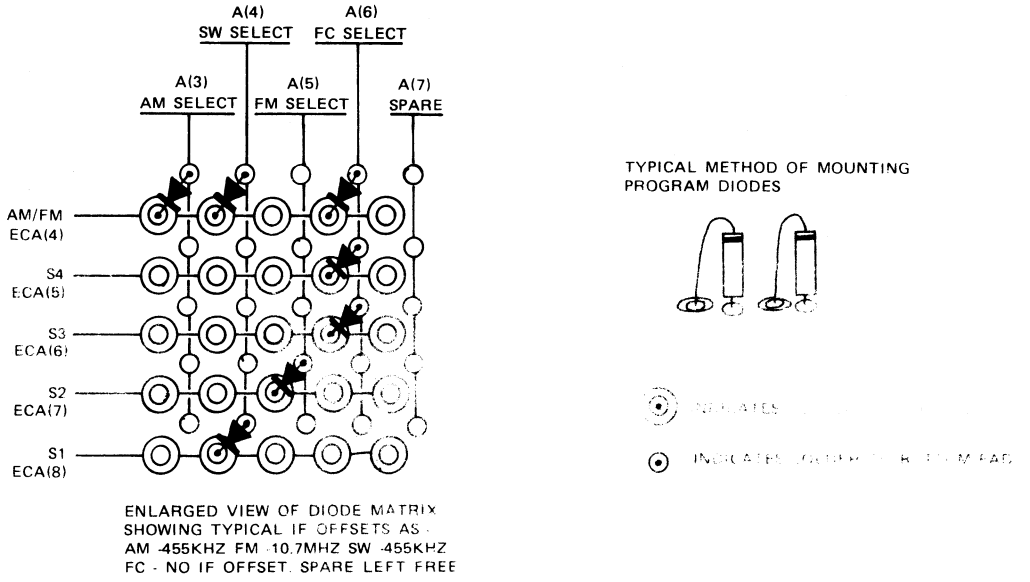
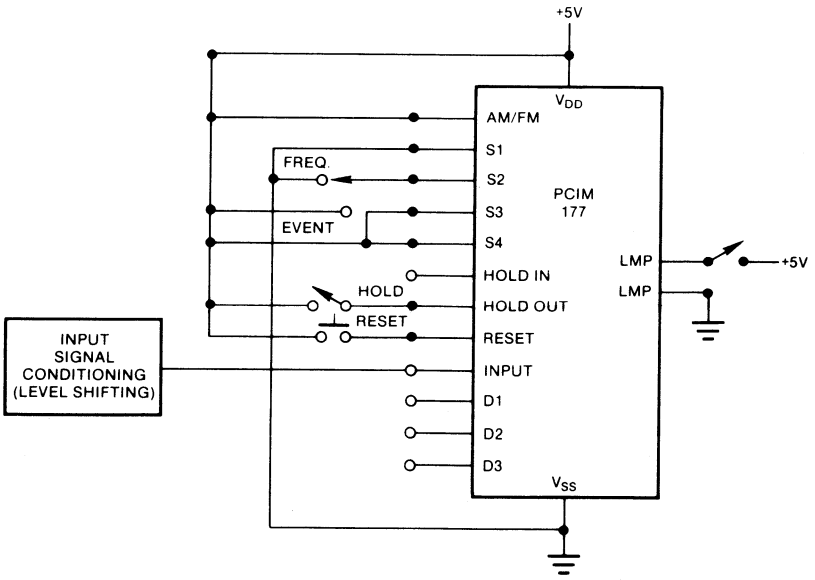


FIGURE 4. EVENT COUNTER/FREQUENCY COUNTER



TYPICAL APPLICATION CIRCUITS

FIGURE 2. AM RADIO FREQUENCY COUNTER