

**067-1180-99**

**SETTLING TIME FIXTURE**

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## DESCRIPTION

The 067-1180-99 is an electronic switching circuit that can be used in conjunction with a 50M10, 50M50, and an FG 5010 to produce a digital sampling system. An external power supply is also needed.

It contains a solid state relay to provide a step function to the unit under test. When the SLEWED TRIGGER is applied equal to the REF IN, a trigger is applied to the 50M10 ESC and delayed by the pulse width of the SLEWED TRIGGER, up to 500  $\mu$ s delay can be developed. Jumpers are provided to allow many configurations.

The following configurations are for the testing of the 50M10 and the amplifier modules of the 50M41 with the M41A1 through M41A8.

## 50M10 Settling Time

Addresses: MI 5010=23, 50M10=slot 1, 50M50=slot 3, FG 5010=24.

- a. Connect the pins marked TO 50M50 (16a–25A and 25B COM) to the like numbered pins of the 50M50.
- b. Connect the power supply to the appropriate pins marked –15, +5, COM, and +15.



*Wrong connections will damage the IC's.*

- c. Connect the FG 5010 OUTPUT to the pins marked SLEWED TRIGGER and the COM just below it.
- d. Connect DATA PRECISION Voltage Calibrator output to the REF IN pin and the COM just below it.
- e. Set ESC jumper to H (or to match ESC jumper in the 50M10).
- f. Set A/D jumper to center (A/D) position.
- g. Jumper pin F to COM next to it.
- h. Set ATN jumper to  $\div 1$ .
- i. Connect 067-1180-00 to 50M10 and run 50M10 Settling Time Program.

### M41A1 through 8 Module Settling Time

Addresses: MI 5010=23, 50M41=slot 1, 50M10=slot 2, 50M50=slot 3, FG 5010=24.

- a. Connect the pins marked TO 50M50 (16a–25A and 25B COM) to the like numbered pins of the 50M50.
- b. Connect the power supply to the appropriate pins marked –15, +5, COM, and +15.



*Wrong connections will damage the IC's.*

- c. Connect the FG 5010 OUTPUT to the pins marked SLEWED TRIGGER and the COM just below it.
- d. Connect the DATA PRECISION Voltage Calibrator output to the REF IN pin and the COM just below it.
- e. Connect output of M41 – module to pin E.
- f. Connect input of M41 – module to pins P and COM next to it.
- g. Set ESC jumper to H (or to match ESC jumper in the 50M10).
- h. Jumper upper 2 pins of A/D together and jumper lower 2 pins of A/D together.
- i. Jumper pin F to COM next to it.
- j. Set ATN jumper to  $\div 1$ .
- k. Connect 067-1180-00 to 50M10 and run M41A1 – 8 Settling Time Program.

a. Connect a PS 502 or equivalent power supply to the -15, +5, COM (gnd), and +15 pins as indicated on the PCB.

**CAUTION**

*Wrong connections will damage the IC's.*

b. Connect the FG 5010 output to the SLEWED TRIGGER and COM pins indicated on the PCB.

c. Set Jumpers as follows:

ATN		÷ 1 (Index)
FSC		H (Index)
F	to	COM
A/D	to	U (lower)

d. Apply power to the PS 502 and FG 5010.

e. Set PS 502 VOLTS to 15 and press OUTPUT ON. (COMMON and gnd connected).

f. Set FG 5010 for:

AMPLITUDE	5 V
OFFSET	+2.5 V
FUNCTION	SQUARE
MODE	CONT
FREQ	1.000 +3 Hz
INCR SIZE	100 Hz
COMPLEMENT	OFF
OUTPUT	ON

g. Use an oscilloscope to monitor the ESC pin (lower right part of PCB) for a 5 V, 1 KHz square wave with a positive duration of about 1.1  $\mu$ s.

h. Adjust ESC WIDTH ADJ for 1.1  $\mu$ s positive duration.

i. Set ESC jumper to L and check for a negative duration of 1.1  $\mu$ s.

j. Connect +5 V to REF IN pin.

k. Connect scope to pin 1 or 10 of U1000.

l. Use the oscilloscope to check for a +5 V square wave with a positive duration of approximately 600  $\mu$ s (must be  $>500 \mu$ s).

m. Push FG 5010 INC until square wave changes to +5 V DC on scope display. Check that the FG 5010 FREQ is less than 1.900 +3 Hz.

Calibration and check out is finished.





SETTLING TIME VERIFICATION PROGRAM 4041

```

100 Rem 3-1-83, Revised 10-27-83
110 Rem -----SETTLING TIME VERIFICATION FOR THE 50M10
120 Rem MI5010 ADDR=23,FG5010 ADDR=24
130 Print "ADDRESSES --- MI5010=23, FG5010=24"
140 Init all
150 On sra then gosub 970
160 Dim v(500),v1(500)
170 V=0
180 V1=0
190 A=0
200 A1=-100
210 E=50.9
220 S=0.1
230 Print "TURN ON TMS006 WITH JUMPERS SET FOR RANGE TO BE TESTED. ";
240 Print "SET REFERENCE VOLTAGE FOR VOLTAGE OF RANGE BEING CHECKED ";
250 Print " (FOR 10X ATTN SET RANGE FOR 100 & INPUT FOR 1 V AND ATTN)";
260 Print " [RET] TO CONTINUE"
270 Input a$
280 Print #23:"SEL 3;ABORT;PURGE;CR M10,1000"
290 Print #24:"FUNC SQ;AMPL 5;OFFS 2.5;MODE TRIG;OUT ON"
300 Print #23:"SEL 1;RANGE?"
310 Input #23:z
320 If z(>)100 and z(>)10 then goto 340
330 Goto 390
340 If z(>)1 then goto 360
350 Goto 390
360 E=200.9
370 S=0.4
380 If a>0 then goto 420
390 If a>0 then goto 420
400 Print "50M10 IS SETUP FOR ";z;" VOLTS. [RET] TO CONTINUE"
410 Input a$
420 Print #23:"SEL 3;ATTACH M10,1,ADC"
430 Print #23:"START"
440 Print #23:"SEL 1"
450 Print #23:"EXT ON"
460 Rem GET DATA
470 For i=1 to e step s
480 X=1/(2*i)*10^6
490 F=int(x*10^(3-int(lst(abs(x))))+0.5)*10^-(3-int(lst(abs(x))))
500 Print #24:"FREQ ";f
510 Wait 0.01
520 Print #24:"MTRIG"
530 Next i
540 If a>0 then goto 590
550 Print "TURN REFERENCE VOLTAGE OFF, REVERSE POLARITY, AND"
560 Print " TURN REFERENCE VOLTAGE BACK ON FOR A NEGITIVE OUTPUT"
570 Print " [RET] TO CONTINUE"

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SETTLING TIME VERIFICATION PROGRAM 4041

```

580     Input a#
590     Wait 1
600     Print #23:"EXT OFF"
610     Print #23:"SEL 3"
620     If a(>)1 then goto 640
630     V1=v
640     Print #23:"SEND M10,BIN16"
650     Input #23:v
660     Gosub 770
670     Rem                                CHECK FOR COMPLETED TEST
680     If a=2 then goto 710
690     Rem                                REPEAT TEST FOR NEGATIVE INPUT
700     Goto 390
710     If z=100 then goto 750
720     Wait 10
730     Print z;" VOLT RANGE"
740     Goto the_end
750     Print "10X ATTN AND 1 VOLT RANGE      10V INPUT"
760     Goto the_end
770     Gosub 810
780     A=s+1
790     Return
800     Rem                                DETERMINE SETTLING TIME
810     For i=500 to 1 step -1
820         If v(i)<(v(500)-2 or v(i)>(v(500)+2 then gosub 860
830     Next i
840     Return
850     Rem                                check for settled condition
860     If i<490 then gosub 910 else print "50M10 DID NOT SETTLE PROPERLY."
870     A1=20
880     I=1
890     Return
900     Rem                                PRINT SETTLING TIME
910     If a=1 then goto 940
920     Print "POSITIVE SETTLING TIME IS ";i*s+1-s;" uS."
930     Return
940     Print "NEGATIVE SETTLING TIME IS ";i*s+1-s;" uS."
950     Return
960     Rem                                SRQ HANDLER
970     Poll x,y;24;23
980     If y=65 or y=98 then goto 1000
990     Print x,y
1000    Return
1010    Goto the_end
1020 The_end:    end

```

SETTLING TIME VERIFICATION PROGRAM 4041

```

1   Gosub init_r
2   Rem                               M41A(X) SETTLLING TIME           DF   6-2-83
4   Key_1:  ! page
5   _Goto 100
100  Init all
110  Enable keys
120  On sra then gosub 10000
125  Enable sra
130  E=0
140  Dim t(1000)
150  T=0
160  Print "TURN ON TEST SYSTEM AND WAIT FOR POWER UP SELF TESTS TO BE ";
170  Print "COMPLETED."
180  Print "SET VOLTAGE CALIBRATOR OUTPUT VOLTAGE TO GIVE A FULL SCALE ";
190  Print "OUTPUT FROM THEM41A1-8 FOR THE GAIN (1 TO 100) AND ";
200  Print "COMPLIANCE (1 VOLT OR 10 VOLTS) SETBY THE INTERNAL JUMPERS. ";
210  Print " A 1000X ATTENUATOR CAN BE USEFUL."
220  Print "          PRESS [RETURN] TO CONTINUE."
230  Input a$
240  Rem      INIT SETUP FG5010          ADDRESS #24
250  Print #24:"INIT;FREQ 2E3;AMPL 5;OFFSET 2.5;SYM 50;NBURST 1000"
260  Print #24:"FUNC SQ"
270  Rem      INIT SETUP MI5010  ADD #23  50M41#1 50M10#2 50M50#3
280  Print #23:"INIT;CLO 1;OUT AMP;FILT ON"
290  Print #23:"SEL 3;ABORT;PURGE;CRE TIME,2000;"
300  Wait 1
310  Print #24:"MODE BURST;OUT ON"
320  Wait 1
330  Print #23:"ATT TIME,1,ADC;START;SEL 2;EXT ON"
340  Wait 1
350  Print #24:"MTRIG"
360  F1=0
370  Gosub 390
380  Goto 610
390  If e<>200 then soto 390
400  E=0
410  Print #23:"SEL 2;EXT OFF;SEL 3;SEND TIME,BIN16"
420  Input #23:t
430  L=0
440  For i=991 to 1000 step 1
450    L=L+t(i)
460  Next i
470  L=int(L/10+0.5)
490  For i=1000 to 1 step -1
500    If t(i)<1+20 and t(i)>1-20 then soto 560
510    If f1=1 then soto 540
520    Print "SETTLING TIME FILTER ON IS ";int(i*0.5+0.6)*1.4;" mS."
530    Goto 550
540    Print "SETTLING TIME FILTER OFF IS ";1.4*(i*0.2+0.8);" uS."
550    I=0

```

SETTLING TIME VERIFICATION PROGRAM 4041

```

560     Next i
590     Return
610     Print " PRESS [RET] FOR TIME WITHOUT FILTER"
620     Input a$
630     Rem          TIME WITHOUT FILTER
640     T=0
650     F1=1
660     Print #24:"MODE TRIG"
670     Print #23:"SEL 1;FILT OFF;SEL 2;EXT ON;SEL 3;ATT TIME,1,ADC;START"
680     For i=1 to 201 step 0.2
690         Z=1/(2*i)*10^6
700         F=int(z*10^(3-int(1st(abs(z))))+0.5)*10^-(3-int(1st(abs(z))))
710         Print #24:"FREQ ";f
720         Wait 0.01
730         Print #24:"MTRIG"
740         Next i
750         Wait 1
760         Gosub 390
780         If I<2048 then goto 810
790         Print "REPEAT TEST WITH NEGATIVE VOLTAGE INPUT."
800         Goto 990
810         Print "UNLESS ALREADY TESTED REPEAT TEST WITH POSITIVE VOLTAGE INPUT."
990         Goto the_end
10000    Rem          SRQ ROUTINE
10010    E=0
10020    Poll y,x
10030    If y=65 or y=81 then goto 10150
10050    If x=24 then goto 10120
10060    Print #23:"ERR?"
10070    Input #23:a$
10080    E=val(a$)
10090    If e=200 then goto 10150
10100    Print "MI5010 REPORTS ";a$
10110    Goto 10150
10120    Print #24:"ERR?"
10130    Input #24:a$
10140    Print "FG5010 REPORTS ";a$
10150    Resume
10170    Print "input address to talk to (23 or 24). ";
10180    Input a
10190    Print "input message when > is seen."
10200    On sra then gosub 10000
10210    Enable sra
10220    Print "> ";
10230    Input s$
10240    P=pos(s$,"?",1)
10250    P1=pos(s$,"SEND",1)

```

SETTLING TIME VERIFICATION PROGRAM 4041

```
10260      Print #a:s$
10270      If p=0 and p1=0 then goto 10220
10280      Input #a:a$
10290      Print "@ " ;a$
10300      Goto 10220
10302 Init_r: ! first code executed
10303      On key(1) then sosub key_1
10318      Return
10319 The_end:      end
```



## Replaceable Parts

### CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
00779	AMP, INC.	P.O. BOX 3608	HARRISBURG, PA 17105
04713	MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.	5005 E MCDOWELL RD, PO BOX 20923	PHOENIX, AZ 85036
05574	VIKING INDUSTRIES, INC.	21001 NORDHOFF STREET	CHATSWORTH, CA 91311
15238	ITT SEMICONDUCTORS, A DIVISION OF INTER NATIONAL TELEPHONE AND TELEGRAPH CORP.	P.O. BOX 168, 500 BROADWAY	LAWRENCE, MA 01841
17856	SILICONIX, INC.	2201 LAURELWOOD DRIVE	SANTA CLARA, CA 95054
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
32997	BOURNS, INC., TRIMPOT PRODUCTS DIV.	1200 COLUMBIA AVE.	RIVERSIDE, CA 92507
56289	SPRAGUE ELECTRIC CO.	87 MARSHALL ST.	NORTH ADAMS, MA 01247
59660	TUSONIX INC.	2155 N FORBES BLVD	TUCSON, AZ 85705
79136	WALDES, KOHINOOR, INC.	47-16 AUSTEL PLACE	LONG ISLAND CITY, NY 11101
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601

## Replaceable Electrical Parts

Ckt No.	Tektronix		Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
	Part No.	Eff	Dscont				
	670-8548-00				CKT BOARD ASSY:SETTLING TIME	80009	670-8548-00
C1000	283-0111-00				CAP.,FXD,CER DI:0.1UF,20%,50V	56289	273C11
C1001	283-0111-00				CAP.,FXD,CER DI:0.1UF,20%,50V	56289	273C11
C1002	283-0111-00				CAP.,FXD,CER DI:0.1UF,20%,50V	56289	273C11
C1010	283-0111-00				CAP.,FXD,CER DI:0.1UF,20%,50V	56289	273C11
C1020	283-0054-00				CAP.,FXD,CER DI:150PF,5%,200V	59660	855-535U2J0 151J
P1020	131-0993-00				BUS,CONDUCTOR:2 WIRE BLACK	00779	850100-01
P1040	131-0993-00				BUS,CONDUCTOR:2 WIRE BLACK	00779	850100-01
P1050	131-0993-00				BUS,CONDUCTOR:2 WIRE BLACK	00779	850100-01
P1060	131-0993-00				BUS,CONDUCTOR:2 WIRE BLACK	00779	850100-01
R1020	321-0313-00				RES.,FXD,FILM:17.8K OHM,1%,0.125W	91637	MFF1816G17801F
R1030	321-0631-00				RES.,FXD,FILM:12.5K OHM,1%,0.125W	91637	MFF1816G12501F
R1040	311-1227-00				RES.,VAR,NONWIR:5K OHM,20%,0.50W	32997	3386F-T04-502
U1000	156-1236-00				MICROCKT,INTFC:DUAL SPST ANALOG SWITCH	17856	SDG18138
U1010	156-2023-00				MICROCKT,DI:DUAL MONOSTABLE RETRIGGERABLE		
VR1000	152-0520-00				SEMICONV DEVICE:ZENER,1W,12V,5%	15238	Z6033
VR1010	152-0520-00				SEMICONV DEVICE:ZENER,1W,12V,5%	15238	Z6033
VR1020	152-0772-00				SEMICONV DEVICE:ZENER,SI,5.6V,5%,1.0W	04713	1N4734A



## Replaceable Mechanical Parts

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont									
	129-0647-00			2						SPACER,POST:0.205 L,W/4-40 THRU THD,BRS	80009	129-0647-00
	131-0608-00			46						TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	131-3082-00			1						CONN,RCPT,ELEC:EDGE CARD	05574	ORD BY DESCR
	200-2882-00			1						COVER,BOTTOM:	80009	200-2882-00
	200-2883-00			1						COVER, TOP:	80009	200-2883-00
	200-2900-00			1						COVER,FRONT:	80009	200-2900-00
	211-0008-00			10						SCREW,MACHINE:4-40 X 0.250,PNH,STL,POZ	83385	ORD BY DESCR
	211-0105-00			2						SCREW,MACHINE:4-40 X 0.188,100 DEG,FLH ST	83385	ORD BY DESCR
	214-3493-00			1						THUMBSCREW:4-40 X 3.96,0.25 OD	80009	214-3493-00
	342-0658-00			1						INSUL,BOT COVER:		
	354-0324-00			1						RING,RETAINING:E SHAPE,0.102 ID X 0.270	79136	5133-14-MD
	386-5071-00			1						PLATE,FRONT:	80009	386-5071-00
	386-5107-00			1						PLATE,REAR:	80009	386-5107-00
										STANDARD ACCESSORIES		
	061-2922-00			1						MANUAL,TECH:INSTR	80009	061-2922-00
	062-7125-00			1						TAPE,PROGRAMMED	80009	062-7125-00



