

2232 DIGITAL STORAGE OSCILLOSCOPE SERVICE

WARNING

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. REFER TO OPERATORS SAFETY SUMMARY AND SERVICE SAFETY SUMMARY PRIOR TO PERFORMING ANY SERVICE.

*Please Check for
CHANGE INFORMATION
at the Rear of This Manual*

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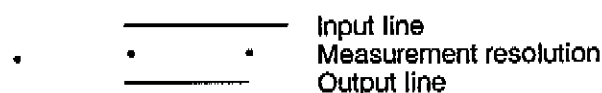
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numbers with discretely numbered times. Many measurements must be rounded or truncated. The size of the truncation or rounding becomes a part of the measurement error. For example, the following line is 1.5 units long. If it must be drawn as a line connecting points one unit apart, then it may be drawn as a line one unit long or two units long, depending on how it occurs relative to the points.

Case 1: Line approaches three points:



Case 2: Line approaches two points:



There are several places where measurements are quantified, and a one-count error in the measurement cannot be detected. The input channels are digitized to an 8-bit resolution, where one division is (ignoring expansion and compression) 25 counts. This means there is an inherent error of 1/25 of a division in any voltage measurement at acquisition time. Averaging can increase the resolution of a voltage measurement above the sampler's eight-bit limit. To use the increased resolution, the display has a 10-bit dynamic range in the vertical axis, as well as the horizontal axis. An averaged signal has a resolution of 100 points per division (ignoring expansion and compression). In addition, the averaged number is stored with up to twelve bits of resolution. Expansion is required to view the eleventh and twelfth bits of increased resolution.

Time is quantified to determine when each sample occurred and which display interval gets each sample. Time is resolved by storing, for example, 4K points. If 4K points are stored, 4K time intervals are represented. However, in 4K mode, not all of the 4K-point resolution may be displayed on the 10-bit (1K-point) screen. Therefore, if 4K COMPRESS is selected to present the whole picture on-screen at once, only 1K resolution remains in the display. When peak-detected information is acquired, events with high-frequency content such as fast steps, or short pulses, can only be located within the time interval from which the peaks came. Even though two display points result from the interval, the event cannot be tied with certainty to the first or second point in the interval.

Time is also quantified to determine where to put points in REPETITIVE acquisitions, where the points acquired at

50 ns intervals fill only part of the screen. A counting device produces a number to represent the portion of 50 ns between the samples acquired and the ones that would have included the trigger. This number ranges from 0 to about 205, which allows accurate placement into the display record. The display record will have at most 100 slots to choose from on the basis of the 0-205 number (this is where each slot represents 0.5 ns of acquisition time, and the counter's resolution is about 0.244 ns per count).

STANDARD ACCESSORIES

The following items are standard accessories shipped with the 2232 instrument:

- 1 Operators Manual
- 1 Users Reference Guide
- 2 Probe Packages
- 1 Front Panel Cover
- 1 Accessory Pouch
- 1 Power Cord
- 1 Fuse
- 1 DB-9 Male Connector and Connector Shell
- 1 Loop Clamp
- 1 Flat Washer
- 1 Self-Tapping Screw

For part numbers and further information about both standard and optional accessories, refer to "Options and Accessories" (Section 7) of this manual. Your Tektronix representative, local Tektronix Field Office, or Tektronix products catalog can also provide additional accessories information.

PERFORMANCE CONDITIONS

The following electrical characteristics (Table 1-1) are valid when the instrument has been adjusted at an ambient temperature between +20°C and +30°C (+68°F and 86°F), has had a warm-up period of at least 20 minutes, and is operating at an ambient temperature between 0°C and +50°C (32°F and 122°F) (unless otherwise noted).

Items listed in the "Performance Requirements" column are verifiable qualitative or quantitative limits that define the measurement capabilities of the instrument.

Environmental characteristics are given in Table 1-2. This instrument meets the requirements of MIL-T-28800D for Type III, Class 5 equipment, except where noted otherwise.

Physical characteristics of the instrument are listed in Table 1-3.

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Discount	Name & Description	Mfr. Code	Mfr. Part No.
A2	671-1488-00			CIRCUIT BOARD:ATTENUATOR A02	80009	671-1488-00
A2AT1	307-1014-06			ATTENUATOR, FXD:100X	80009	307-1014-06
A2AT2	307-1013-00			ATTENUATOR, FXD:10X	80009	307-1013-00
A2AT51	307-1014-06			ATTENUATOR, FXD:100X	80009	307-1014-06
A2AT52	307-1013-00			ATTENUATOR, FXD:10X	80009	307-1013-00
A2C2	285-1106-00			CAP, FXD, PLASTIC:0.022UF, 20%, 600V	14752	230B1F223
A2C3	281-0294-00			CAP, VAR, CER DI:6-50PF, 250VDC	52769	GKU50000
A2C6	283-0000-00	B010100	B011169	CAP, FXD, CER DI:0.001UF, +100-0%, 500V	59660	831-610-Y5U0102P
A2C6	285-1462-00	B011170		CAP, FXD, PLASTIC:1000PF, 20%, 400V	TK1913	FKS2100040020
A2C7	283-0898-00			CAP, FXD, CER DI:2.7PF, 50V, 0.25%	51406	RPE110C062R7C50V
A2C9	281-0826-00			CAP, FXD, CER DI:2200PF, 10%, 100V	20932	401EM100AD222K
A2C10	283-0100-00			CAP, FXD, CER DI:0.0047UF, 10%, 200V	04222	SR306A472KAA
A2C13	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C17	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C21	281-0773-00			CAP, FXD, CER DI:0.01UF, 10%, 100V	04222	MA201C103KAA
A2C26	281-0294-00			CAP, VAR, CER DI:6-50PF, 250VDC	52769	GKU50000
A2C27	281-0893-00			CAP, FXD, CER DI:4.7PF, +/-0.5PF, 100V	04222	MA101A4R7DAA
A2C30	281-0775-01			CAP, FXD, CER DI:0.1UF, 20%, 50V	04222	SA105E104MAA
A2C35	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C38	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C52	285-1106-00			CAP, FXD, PLASTIC:0.022UF, 20%, 600V	14752	230B1F223
A2C53	281-0294-00			CAP, VAR, CER DI:6-50PF, 250VDC	52769	GKU50000
A2C56	283-0000-00	B010100	B011169	CAP, FXD, CER DI:0.001UF, +100-0%, 500V	59660	831-610-Y5U0102P
A2C56	285-1462-00	B011170		CAP, FXD, PLASTIC:1000PF, 20%, 400V	TK1913	FKS2100040020
A2C57	283-0898-00			CAP, FXD, CER DI:2.7PF, 50V, 0.25%	51406	RPE110C062R7C50V
A2C59	281-0826-00			CAP, FXD, CER DI:2200PF, 10%, 100V	20932	401EM100AD222K
A2C60	283-0100-00			CAP, FXD, CER DI:0.0047UF, 10%, 200V	04222	SR306A472KAA
A2C63	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C67	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C71	281-0773-00			CAP, FXD, CER DI:0.01UF, 10%, 100V	04222	MA201C103KAA
A2C76	281-0294-00			CAP, VAR, CER DI:6-50PF, 250VDC	52769	GKU50000
A2C77	281-0893-00			CAP, FXD, CER DI:4.7PF, +/-0.5PF, 100V	04222	MA101A4R7DAA
A2C80	281-0775-01			CAP, FXD, CER DI:0.1UF, 20%, 50V	04222	SA105E104MAA
A2C85	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C88	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C90	290-0776-00			CAP, FXD, ELCTLT:22UF, +50-20 %, 10V	55680	ULA1A220TAA
A2C91	290-0776-00			CAP, FXD, ELCTLT:22UF, +50-20 %, 10V	55680	ULA1A220TAA
A2C93	290-0776-00			CAP, FXD, ELCTLT:22UF, +50-20 %, 10V	55680	ULA1A220TAA
A2C94	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2C96	290-0776-00			CAP, FXD, ELCTLT:22UF, +50-20 %, 10V	55680	ULA1A220TAA
A2C97	281-0862-00			CAP, FXD, CER DI:0.001UF, +80-20%, 100V	04222	MA101C10ZMAA
A2CR7	152-0324-00			SEMICON DVC, DI:SW, SI, 35V, 0.1A, DO-7	14552	MT5128
A2CR18	152-0141-02			SEMICON DVC, DI:SW, SI, 30V, 150MA, 30V, DO-35	03508	DA2527 (1N4152)
A2CR57	152-0324-00			SEMICON DVC, DI:SW, SI, 35V, 0.1A, DO-7	14552	MT5128
A2CR68	152-0141-02			SEMICON DVC, DI:SW, SI, 30V, 150MA, 30V, DO-35	03508	DA2527 (1N4152)
A2J9103	131-0608-00			TERMINAL, PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 4)	22526	48283-036
A2J9108	131-0608-00			TERMINAL, PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 4)	22526	48283-036
A2L90	120-0382-01			COIL, RF:210UH, +28/-43%; 14 TURNS	TK1345	120-0382-01
A2L91	120-0382-01			COIL, RF:210UH, +28/-43%, 14 TURNS	TK1345	120-0382-01
A2L93	120-0382-01			COIL, RF:210UH, +28/-43%, 14 TURNS	TK1345	120-0382-01
A2L96	120-0382-01			COIL, RF:210UH, +28/-43%, 14 TURNS	TK1345	120-0382-01
A2P9091	131-0608-00			TERMINAL, PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 3)	22526	48283-036
A2P9200	131-0787-00			TERMINAL, PIN:0.64 L X 0.025 SQ PH BRZ (QUANTITY OF 2)	22526	47359-000
A2Q13	151-1124-00			TRANSISTOR:JFE, N-CHAN, SI, SEL, TO-92	17856	J-2400

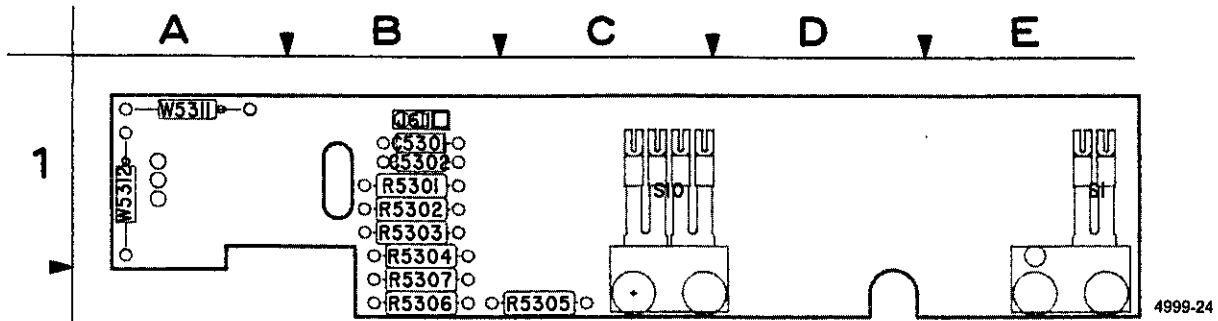


Figure 9-7. A14—CH 1 Logic board.

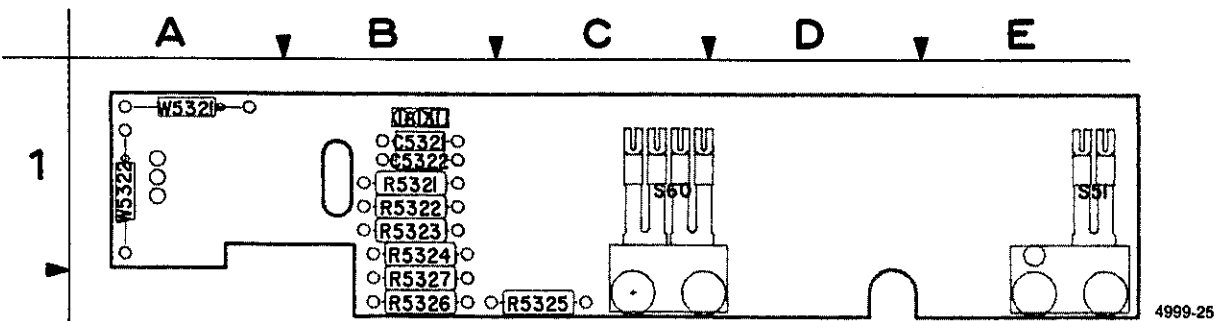
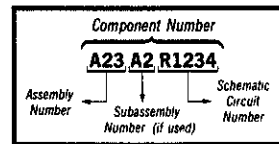


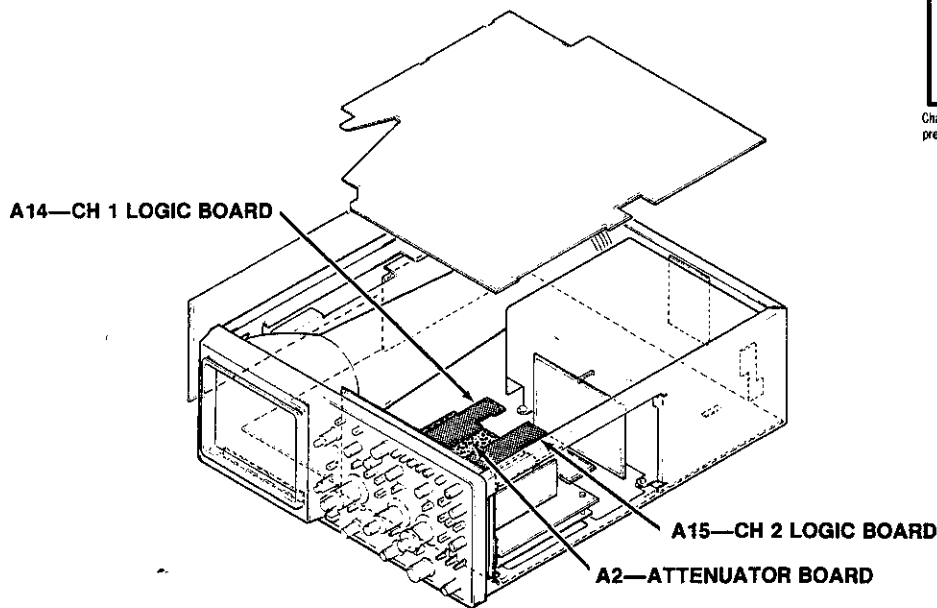
Figure 9-8. A15—CH 2 Logic board.

 Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



A14—CH1 LOGIC BOARD

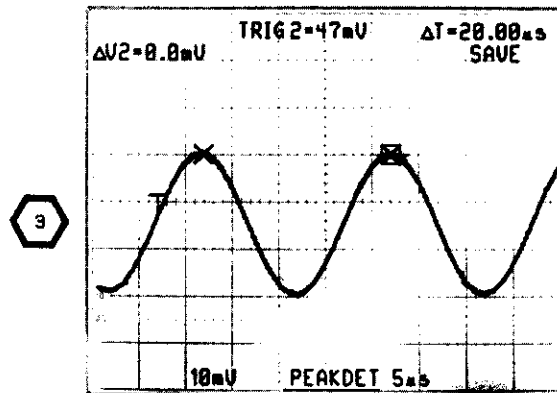
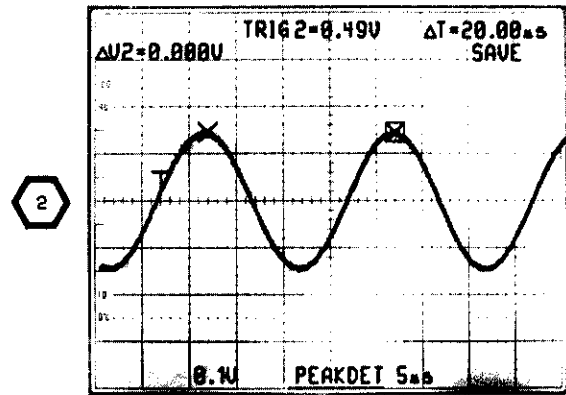
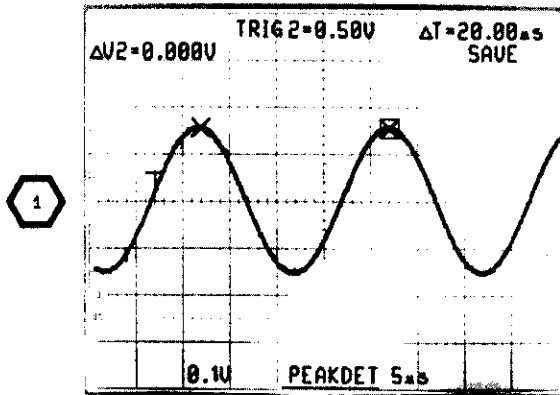
CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C5301	1	R5301	1	R5306	1
C5302	1	R5302	1	R5307	1
		R5303	1		
J6111	1	R5304	1	W5311	1
		R5305	1	W5312	1


A15—CH2 LOGIC BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C5321	1	R5321	1	R5326	1
C5322	1	R5322	1	R5327	1
		R5323	1		
J6112	1	R5324	1	W5321	1
		R5325	1	W5322	1

WAVEFORMS FOR DIAGRAM 1

CONNECT 6-DIVISION 50-KHz SIGNAL FOR WAVEFORMS 1 THROUGH 3



CH1 & CH2 ATTEN. 
 SHT. 1 OF 3

CH 1 & CH 2 ATTENUATORS 

CH1 AND CH2 ATTENUATORS DIAGRAM 1

ASSEMBLY A2											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
AT1	2C	1B	CR57	5F	4C	R23	3K	1E	R68	5G	3D
AT2	2D	1C	CR68	5G	3C	R25	3K	1E	R69	5H	4D
AT51	5C	3B				R26	3K	1D	R71	6J	3E
AT52	5D	3C	J9103	2M	2E	R27	2L	2E	R72	6K	3E
			J9108	5M	4E	R29	3L	2E	R73	5K	3E
C2	2B	1B				R30	3K	2E	R75	6K	3E
C3	2F	1C	P9200	8B	3A	R31	3L	2E	R76	6K	3D
C6	2E	1C				R33	3K	2E	R77	5L	4E
C7	2F	1C	Q13	2F	2C	R34	4L	2E	R79	6L	4E
C9	3F	1D	Q15	3F	1D	R35	4L	1E	R80	6K	4E
C10	3F	1D	Q18	2G	1C	R37	4L	2E	R81	6L	4E
C13	2F	2C	Q63	5F	4C	R38	4M	1E	R83	6K	4E
C17	2G	1C	Q65	6F	3D	R39	4M	1F	R84	6L	4E
C21	3J	1E	Q68	5G	3C	R41	4M	1E	R85	7L	3E
C26	3K	1D				R42	4M	1F	R87	6L	4E
C27	3L	2E	R1	2A	2A	R43	4M	2F	R88	7M	3E
C30	3K	2E	R2	2A	2A	R46	3G	1D	R91	7K	3E
C35	4L	1E	R3	2E	1C	R47	1C	1D	R93	7K	4F
C38	4M	1E	R4	2B	2A	R48	3G	1D	R96	6G	3D
C52	5B	3B	R5	3E	1B	R51	5A	4A	R97	6G	3D
C53	5F	3C	R6	2E	2C	R52	5A	3A	R98	6G	3D
C56	5E	4C	R7	3C	1B	R53	5E	3C			
C57	5F	3C	R8	2B	2A	R54	5B	3A	S1	4A	2A
C59	6F	3D	R9	3F	1C	R55	6E	3C	S10	4K	2C
C60	6F	3D	R10	3E	1D	R56	5E	4C	S43	1M	2F
C63	5F	4C	R11	2F	1C	R57	5C	3B	S51	4A	4A
C67	5G	3C	R12	3D	1B	R58	5B	4A	S60	4C	4B
C71	5J	3E	R13	2F	2D	R59	5F	3C	S93	8M	4F
C76	6K	3D	R14	2F	1C	R60	6E	3D			
C77	6L	4E	R15	3F	1D	R61	5F	3C	U10	2E	1C
C80	6K	4E	R16	3F	1C	R62	5D	3B	U30	2L	2E
C85	7L	3E	R17	2G	1D	R63	5F	4D	U60	5E	3C
C88	7M	3E	R18	2G	1D	R64	5F	3C	U80	5L	4E
			R19	2H	2D	R65	6F	3D			
CR7	2F	2C	R21	3J	1E	R66	6F	3C	W43	4M	1E
CR18	2G	1C	R22	3K	1E	R67	5G	3D	W93	7K	3E

Partial A2 also shown on diagram 10.

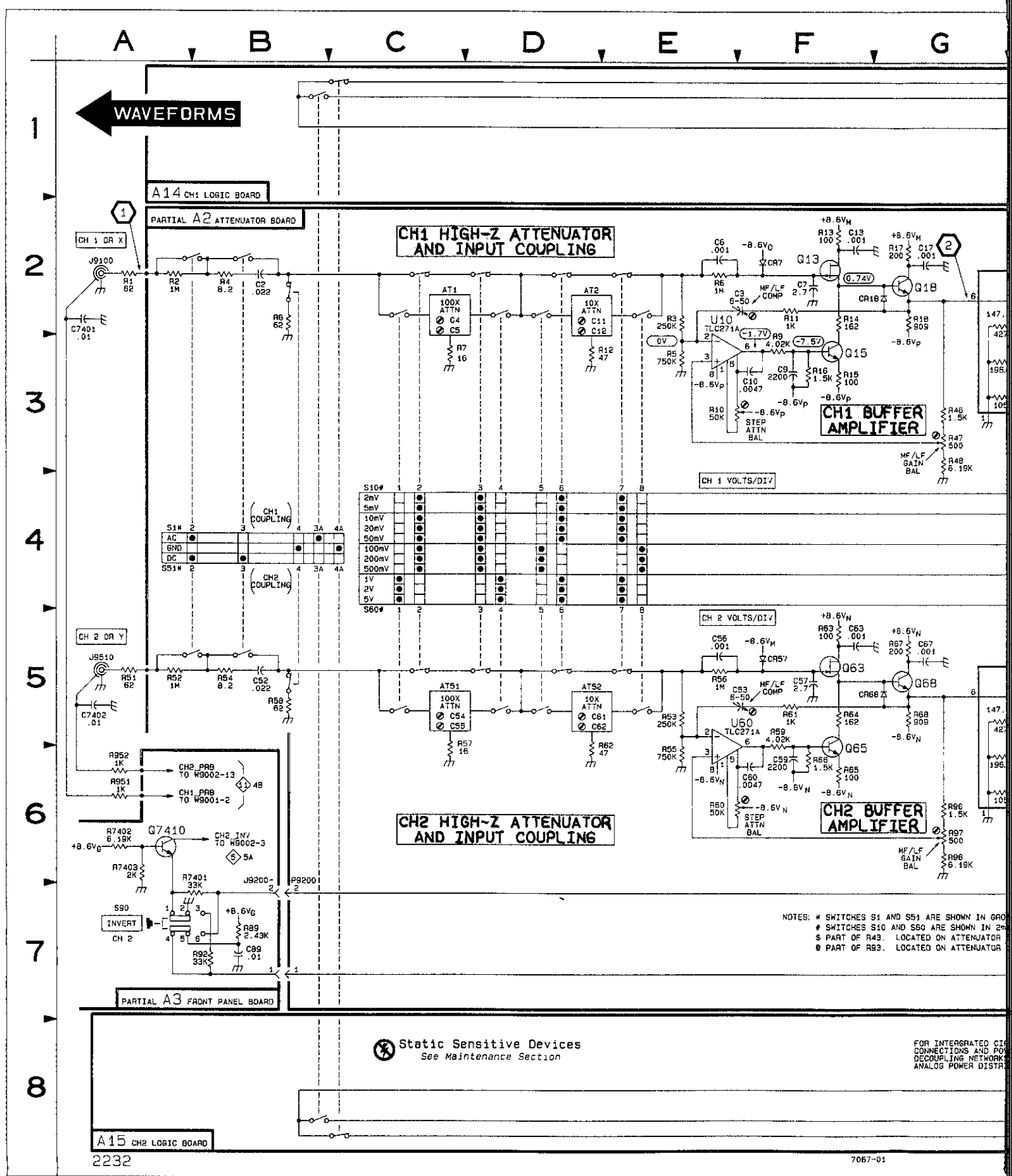
ASSEMBLY A3											
C89	7B	4C	Q7410	6A	4B	R92	7B	4B	R7403	6A	5C
J9200	7B	4B	R89	7B	4C	R7401 R7402	6B 6A	4A 5C	S90	7A	4B


Partial A3 also shown on diagrams 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12.

ASSEMBLY A14											
C5301	1K	1B	R5301	1K	1B	R5304	1J	1B	W5311	1M	1A
C5302	1M	1B	R5302	1J	1B	R5305	1M	1C	W5312	1L	1A
J6111	1M	1B	R5303	1K	1B	R5306 R5307	1L 1M	1B 1B			

ASSEMBLY A15											
C5321	8K	1B	R5321	8K	1B	R5324	8J	1B	W5321	8M	1A
C5322	8M	1B	R5322	8J	1B	R5325	8M	1C	W5322	8L	1A
J6112	8M	1B	R5323	8K	1B	R5326 R5327	8L 8M	1B 1B			

OTHER PARTS											
C7401	2A	CHASSIS	C7402	5A	CHASSIS	J9100	2A	CHASSIS	J9510	5A	CHASSIS



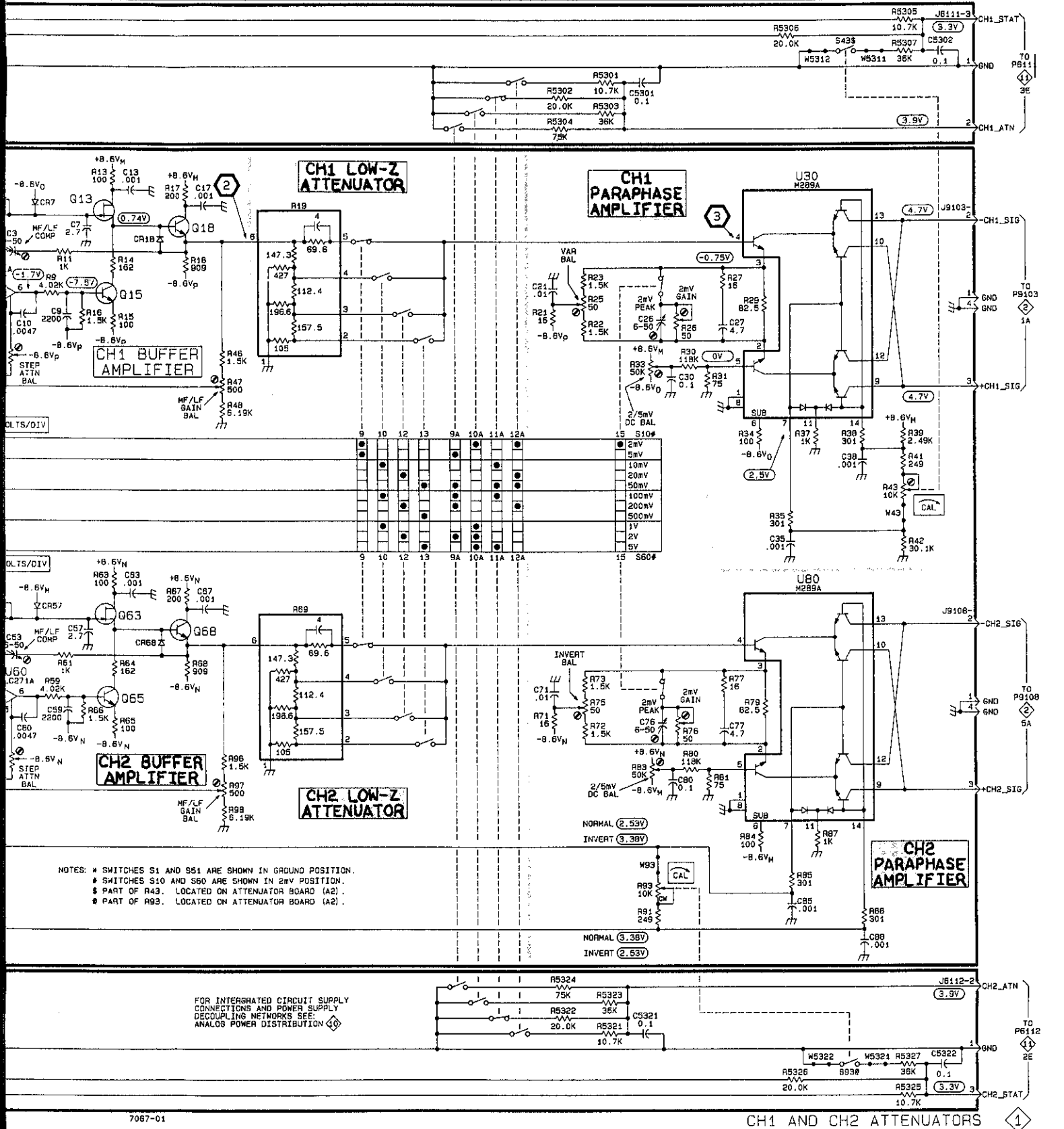
 Static Sensitive Devices
 See Maintenance Section

FOR INTEGRATED CIRCUIT CONNECTIONS AND POWER DECOUPLING NETWORKS ANALOG POWER DISTRIBUTION

CH1 & CH2 ATTEN.
SHT. 3 OF 3



F G H J K L M N



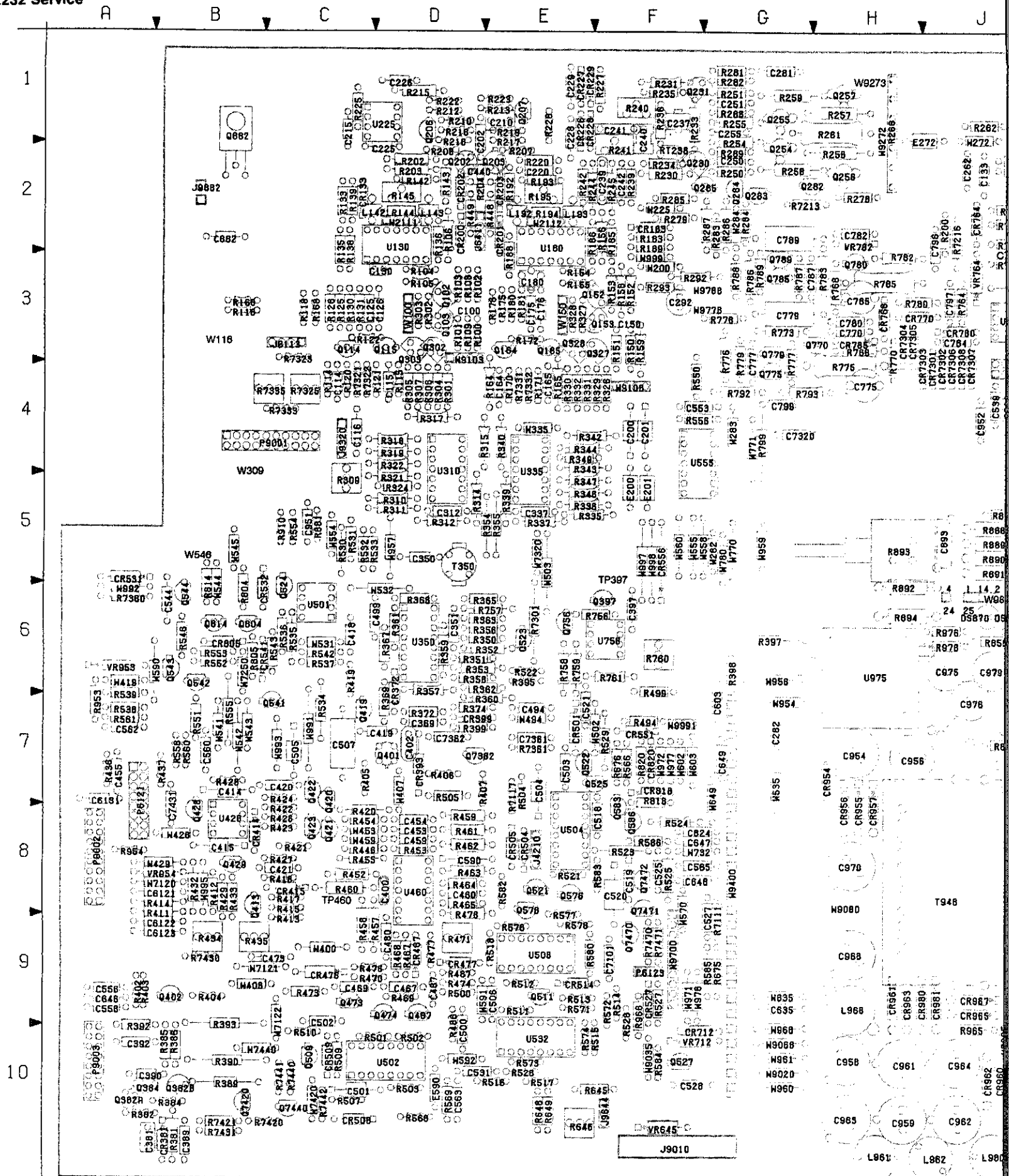


Figure 9-9. A1—Main board.

INTERCONNECTIONS

SHT. 2 OF 13

W9001 (A3) TO/FROM J9001 (A1)

A3 - FRONT PANEL W9001			SIGNAL	A1 - MAIN J9001			A3
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES	WIRE
1	2	8D	CH2_SEL(L)	1	2	8D	1
2	11	4B	CH1_PRB	2	11	4C	2
3	2	8D	CH1_SEL(L)	3	2	8D	3
4	4	1B	XY	4	4	1B	4
5	9	6B	BPINTENS	5	9	6B	5
6	9	6F	BEAMFIND	6	9	6F	6
7	10	2J	+8.6V G	7	10	2H	7
8	3	2E	A/B_SWP_SEP	8	3	2F	8
9	10	3J	-8.6V H	9	10	3H	9
10	2	1D	CH1_POS_TOP	10	2	1D	10
11	9	5B	A_INTENS	11	9	5B	11
12	2	2D	CH1_POS_BOT	12	2	2D	12
13	9	5B	STOR_INTENS	13	9	5B	13
14	2	5D	CH2_POS_TOP	14	2	5D	14
15	8	1C	PWR_LED	15	8	1C	15
16	2	5D	CH2_POS_BOT	16	2	5D	16
17	4	2B	STORE_ON	17	4	2B	
18	9	7B	GRAT_LEV	18	9	7B	
19	10	2J	GND	19	10	2H	
20	9	7B	GRAT_PWR	20	9	7B	

W9705 (A4) TO/FROM J9705 (A1)

A4 - TIMING W9705			SIGNAL	A1 - MAIN J9705			WIRE
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES	WIRE
1	10	5J	GND	1	10	5H	1
2	7	6G	-SWP	2	7	6G	2
3	7	4G	+SWP	3	7	4G	3
4	10	5J	GND	4	10	5J	4
5	7	6D	X_AXIS_SIG	5	7	6D	5
6	10	6J	-8.6VL	6	10	4H	6
7	10	4J	+8.6VL	7	10	4H	7
8	10	4J	+30VA	8	10	4H	8

W9003 (A3) TO/FROM J9003 (A1)

GRID COORDINATES	A3 - FRONT PANEL W9003			SIGNAL	A1 - MAIN J9003		
	WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES
	1	4	5C	EXT_INPUT	1	4	5C
	2	4	6C	GND	2	4	6C
	3	10	3J	GND	3	10	3H
	4	10	4J	GND	4	10	4H
	5	4	7C	EXT(L)	5	4	7C
	6	4	8C	LF_REF	6	4	8C
	7	5	2B	SGL_SWP	7	5	2B
	8	6	2B	B_SLOPE	8	6	2B
	9	5	3E	TRIG'D_LED	9	5	3E
	10	4	7C	LINE(L)	10	4	7C
	11	4	8C	INT(L)	11	4	8C
	12	4	2C	CH2(L)	12	4	2C
	13	4	3C	VERT(L)	13	4	3C
	14	4	3C	CH1(L)	14	4	3C
	15	6	1B	B_LEVEL	15	6	1B
	16	6	4B	B_ONLY(L)	16	6	4B

W9700 (A1) TO/FROM J9700 (A4)

GRID COORDINATES	A1 - MAIN W9700			SIGNAL	A4 - TIMING J9700		
	WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES
	1	7	5D	A_DISP	1	7	5D
	2	7	5D	B_DISP	2	7	5D
	3	6	3L	B_SWEEP	3	6	3L
	4	5	7C	VAR_HOLDOFF	4	5	7C
	5	5	8C	AC1	5	5	8C
	6	5	8C	AC2	6	5	8C
	7	5	3L	A_SWEEP	7	5	3L
	8	5	2L	A_GATE(L)	8	5	2L
	9	5	2L	GND	9	5	2L
	10	6	2L	B_SWP_GATE(L)	10	6	2L

W9400 (A1) TO/FROM A5

A1 - MAIN W9400			SIGNAL	A5 - ALT SWEEP W9400			WIRE
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES	
1	6	2C	B_SIGNAL	1	6	2D	1
2	6	2C	B_TRIG_SLOPE	2	6	2D	2
3	10	7H	GND	3	10	7J	3
4	6	1C	B_TRIG_LEVEL	4	6	1D	4
5	7	5C	A_DISP	5	7	5B	5
6	6	4C	B_ONLY(L)	6	6	4D	6
7	3	3H	SEP(L)	7	3	3G	7
8	9	6C	B_INTENS_LEV	8	9	6C	8
9	9	6F	B_INTENS_ZONE	9	9	6E	
10	6	6C	HALT	10	6	6D	
11	7	5C	B_DISP	11	7	5B	
12	6	5C	CH1_SELECTED	12	6	5D	
13	6	6C	A_ONLY(L)	13	6	6D	
14	6	7C	B_DELAY_TIME_POS	14	6	7D	
15	10	7H	GND	15	10	7J	
16	10	8H	GND	16	10	8J	
17	6	2K	B_SWP_GATE(L)	17	6	2K	WIRE
18	10	8H	GND	18	10	8J	1
19	6	5C	VALT(L)	19	6	5D	2
20	6	8C	A_SWEEP	20	6	8D	3
21	6	5C	ALT_SYNC	21	6	5D	4
22	6	3K	B_SWEEP	22	6	3K	5
23	10	8H	GND	23	10	8J	6
24	10	8H	GND	24	10	8J	7
25	10	6H	-8.6VF	25	10	7J	8
26	10	6H	+5VA	26	10	7J	9
27	10	6H	+8.6VA	27	10	6J	10

W9991 (A1) TO/FROM J9991 (A2)

A1 - MAIN W9991			SIGNAL	A2 - ATTENUATOR J9991		
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES
1	10	1H	+8.6VL	1	10	1J
2	10	1H	GND	2	10	1J
3	10	2H	-8.6VL	3	10	2J

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INTERCONNECTIONS
SHT. 5 OF 13

W9011 (A10) TO/FROM J9010 (A1)

A10 - STORAGE W9011			SIGNAL	A1 - MAIN J9010			A
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES	WIRE
1	20	1A	+5V	1	10	7H	1
2	20	1A	GND	2	10	7H	2
3	20	2A	+8.6VA	3	10	7H	
4	20	2A	+5VA	4	10	7H	
5	20	3A	GND	5	10	7H	
6	20	3A	GND	6	10	7H	
7	20	4A	-5VA	7	10	7H	
8	20	5A	-8.6VA	8	10	7H	

WIRE

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W1304 A4 TO/FROM A13

A4 - TIMING W1304			SIGNAL	A13 - SWEEP INTERFACE W1304			A
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES	WIRE
1	5	8K	5ms_ASEL	1	5	8K	1
2	5	7K	10ms_ASEL	2	5	7K	2
3	10	4L	GND	3	10	4M	3
4	5	7K	20ms_ASEL	4	5	7K	4
5	5	7K	0.1s/.1s_ASEL	5	5	7K	5
6	5	7K	0.1s_ASEL	6	5	7K	6
7	5	8K	50ms_ASEL	7	5	8K	7
8	5	8K	1ms_ASEL	8	5	8K	8
9	10	4L	GND	9	10	4M	9
10	5	8K	2ms_ASEL	10	5	8K	10
11	6	6M	B_CAPS	11	6	6M	11
12	10	4L	GND	12	10	4M	12
13	6	7H	5ms_BSEL	13	6	7J	13
14	6	7H	10ms_BSEL	14	6	7J	14
15	6	7H	20ms_BSEL	15	6	7J	15
16	6	8H	0.1ms_BSEL	16	6	8J	16
17	6	8H	1ms_BSEL	17	6	8J	17
18	6	8H	2ms_BSEL	18	6	8J	18
19	10	4L	GND	19	10	4M	19
20	10	5L	+5V _L	20	10	5M	20
21	10	6L	-8.6V _L	21	10	6M	21
22	10	5L	GND	22	10	5M	22

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INTERCONNECTIONS
SHT. 6 OF 13

J9250 (A3) TO/FROM P9250 (A4)

A3 - FRONT PANEL J9250			SIGNAL	A4 - TIMING P9250		
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES
1	7	7D	HORZ_POS	1	7	7D
2	4	1B	XY(L)	2	4	1B

W5201 (A4) TO/FROM J5201 (A16)

A4 - TIMING W5201			SIGNAL	A16 - SWEEP REFERENCE J5201		
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES
1	7	1B	GND	1	7	1B
2	7	2B	-8.6L	2	7	2B
3	7	2B	HOR_REF	3	7	2B

J9004 (A3) TO/FROM J9411 (A10)

A3 - FRONT PANEL J9004			SIGNAL	A10 - STORAGE J9411		
WIRE	DIAGRAM	GRID COORDINATES		WIRE	DIAGRAM	GRID COORDINATES
1	12	1C	GND	1	18	2D
2	12	1C	GND	2	19	5C
3	12	1C	SROW3(L)	3	18	2H
4	12	5K	SCOL4(L)	4	18	1D
5	12	2C	SROW2(L)	5	18	2H
6	12	5K	SCOL3(L)	6	18	1D
7	12	3C	SROW1(L)	7	18	2H
8	12	4K	SCOL2(L)	8	18	1D
9	12	4C	SROW0(L)	9	18	2H
10	12	4K	SCOL1(L)	10	18	1D
11	12	7C	GND	11	18	1D
12	12	4K	SCOL0(L)	12	18	1D
13	12	7K	CUR2	13	18	2D
14	12	6K	B_ONLY(L)	14	18	1D
15	12	7K	CUR1	15	18	2D
16	12	6K	A_ONLY(L)	16	18	1D
17	12	7C	+5VREFC	17	18	1D
18	12	6C	+5V	18	18	1D
19	12	5K	STORE_ON(L)	19	18	1D
20	12	7K	ATR_LVL	20	18	2D
21	12	7C	HOR_REF	21	18	1D
22	12	6C	GND	22	19	5C
23	12	7K	HOR_VAR	23	19	5C
24	12	7K	1K/4K	24	19	5C

Date: 05-30-90

Change Reference: C1/0590

Product: 2232 SERVICE

Manual Part Number: 070-7067-00

DESCRIPTION

Product Group 41

EFFECTIVE ALL INSTRUMENTS: TEXT CHANGES

Performance Characteristics

Section Section 1

Table 1-1

Electrical Characteristics

Corrections, Page 1-6

Weight of Last Acquisition	1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, or 1/ 256 (MENU selections). AVERAGE mode default weight is 1/4. ^a
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Page 1-10

Input Resistance	Greater than 10 K Ω (LSTTL compatible). ^a
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Page 1-11

Differential Accuracy	Graticule indication of the voltage cursor difference is within 2% of the readout value, measured over the six divisions. ^a
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Page 1-14

Non-Volatile Memory	26 Kbytes. ^a
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**Table 1-2
Environmental Characteristics**

Page 7-23

Environmental Requirements	The instrument meets the following MIL-T28800D requirements for Type III, Class 5, Style D equipment, except where noted otherwise. ^a
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^aPerformance Requirement not check in manual.

DESCRIPTION

Product Group 41

EFFECTIVE ALL INSTRUMENTS:

Performance Check Procedure

Section 4

VERTICAL

2. Check Store Deflection Accuracy

Page 4-5

Change step a.

- | | |
|-----------------|-------------------|
| a. Set: | |
| CH 2 VOLTS/DIV | 2 mV |
| STORE/NON STORE | STORE (button in) |
| ACQUISITION | MODE AVERAGE |

HORIZONTAL

PROCEDURE STEPS

1. Check Timing Accuracy and Linearity

Page 4-12.

Change the following steps i, j and k.

- i. Use the Horizontal POSITION control to align the 1st time marker that is 40 ns beyond the start of the sweep with the 2nd vertical graticule line.
- j. CHECK— Timing accuracy is within 3% (0.24 divisions at the the 10th vertical graticule line), and linearity is within 7.5 % (0.15 division over ant 2 of the center 8 divisions). Exclude any portion of the sweep past the 100th magnified division.
- k. CHECK— linearity is within 5% (0.1 division over any 2 of the center 8 divisions). Repeat parts i and j for the remaining A SEC/DIV and time-mark generator setting combinations shown in Table A-5 under X10 Magnified column.

2. Check Store Differential and Cursor Time Difference Accuracy

Change step a.

- | | |
|---------------------|-------------------|
| a. Set: | |
| Channel 1 AC-GND-DC | GND |
| Horizontal MODE | A |
| A SEC/DIV | 0.1 ms |
| X10 Magnifier | Off (knob in) |
| STORE/NON-STORE | STORE (button in) |
| ACQUISITION MODE | PEAKDET |

Page 4-13

Change step r.

- r. CHECK— The ΔT readout is between 3.990 μ s and 4.010 μ s.

3. Check Variable Range and Sweep Separation

Page 4-13

Change step d.

- | | |
|---------------------|---------------------|
| d. Set: | |
| Channel 1 AC-GND-DC | GND |
| SEC/DIV Variable | CAL detent |
| Horizontal MODE | BOTH |
| B TRIG | CW (RUNS AFTER DLY) |

Table A-6

Settings for Delay Time Differential Checks

Change the Delay Readout Limits column to read:

3.935 μ s	to	4.065 μ s
39.35 μ s	to	40.65 μ s
393.5 μ s	to	406.5 μ s
3.935 ms	to	4.065 ms
39.35 ms	to	40.65 ms
393.5 ms	to	406.5 ms
3.935 s	to	4.065 s

Page 4-15

11. Check X Bandwidth

Change step c.

- c. Increase the generator output frequency to 2.5 MHz.

EXTERNAL Z-AXIS, PROBE ADJUST, EXTERNAL CLOCK, AND X-Y PLOTTER

INITIAL CONTROL SETTINGS

Page 4-20

A TRIGGER

VAR HOLDOFF	NORM
Mode	P-P AUTO
SLOPE	Positive (button out)
LEVEL	Midrange
A & B SOURCE	VERT MODE
A COUPL	NORM
A EXT COUPL	AC

Page 4-21

4. Check X-Y Plotter

Change step e.

- e. Press Menu Item Select button 3 to select X-Y setup.

Date: 06-11-90

Change Reference: M72619

Product: 2232 SERVICE

Manual Part Number: 070-7067-00

DESCRIPTION

Product Group 41

EFFECTIVE SERIAL NUMBER: B012983

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

A10 Storage board

Change :

C2202	281-0315-00	CAP, CAR, CER, DI: 2.8-10 PF
C2207	281-0315-00	CAP, CAR, CER, DI: 2.8-10 PF
C2235	281-0315-00	CAP, CAR, CER, DI: 2.8-10 PF

Date: 06-11-90 Change Reference: M72619(Revised)

Product: 2232 SERVICE

Manual Part Number: 070-7067-00

DESCRIPTION

Product Group 41

EFFECTIVE SERIAL NUMBER: B012983

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

A10 Storage board

Change :

C2202	281-0315-00	CAP, CAR,CER.DI: 2.8-10 PF
C2207	281-0315-00	CAP, CAR,CER.DI: 2.8-10 PF