
TEK PRODUCT
MODIFICATION

Part No. 040-1425-00
Product Group 85

M79608, M79647
M79836

040 KIT

1180F01

Firmware Enhancement

11801A All Serial Numbers

11801B All Serial Numbers

This modification kit contains firmware, installation instructions, service manual inserts and updated manuals. The new firmware ver. >4.0 provides enhancements and new measurement features.

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Kit Parts List:

Ckt. Number	Quantity	Part Number	Description
A15U140	1 ea.	160-6976-02	Microckt, dgtl:CMOS, EPROM, ver 4.00
A15U150	1 ea.	160-6977-02	Microckt, dgtl:CMOS, EPROM, ver 4.00
A18U930	1 ea.	160-6978-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A18U830	1 ea.	160-6979-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A18U820	1 ea.	160-6984-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A18U920	1 ea.	160-6985-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A18U810	1 ea.	160-6986-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A18U910	1 ea.	160-6987-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A18U800	1 ea.	160-6988-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A18U900	1 ea.	160-6989-06	Microckt, dgtl:CMOS, EPROM, ver 4.03
A5U400	1 ea.	160-6980-02	Microckt, dgtl:CMOS, EPROM, ver 4.01
A5U310	1 ea.	160-6981-02	Microckt, dgtl:CMOS, EPROM, ver 4.01
A5U410	1 ea.	160-6982-02	Microckt, dgtl:CMOS, EPROM, ver 4.01
A5U300	1 ea.	160-6983-02	Microckt, dgtl:CMOS, EPROM, ver 4.01
A25U611	1 ea.	160-4288-05	Microckt, dgtl:CMOS, EPROM, ver 9.02
A28U611	1 ea.	160-4288-05	Microckt, dgtl:CMOS, EPROM, ver 9.02
	1 ea.	070-8783-00	Manual: User
	1 ea.	070-8784-00	Manual: Programmers
	1 ea.	_____	Label: Kit

Instructions

WARNING

Dangerous shock hazards may be exposed when the instrument covers are removed. Before proceeding, ensure the mainframe power switch is in the off position. Then, disconnect the instrument from the power source. Disassembly should only be attempted by qualified service personnel.

*A lithium battery (BT150) is mounted on the Memory circuit board A18. **The battery requires special handling for disposal.** Refer to the instructions on Lithium Battery Disposal and First Aid earlier in this section. Care is required when placing the Memory circuit board A18 on metal surfaces. If some IC or battery leads are shorted, the battery may discharged or overheat and vent. (Plastic standoffs are used to prevent shorts.)*

CAUTION

*Many components within this instrument are extremely susceptible to static-discharge damage. Service the instrument only in a static-free environment. **Observe standard handling precautions for static-sensitive devices while installing this kit. Always wear a grounded wrist and foot strap.***

NOTE

When this kit is installed the stored settings and stored waveforms will be erased.

NOTE

These instructions assume a familiarity with the instrument. If additional assembly or disassembly details are required, refer to the Service Reference Manual.

Cover and Card Cage Disassembly

- Step 1:** Remove the top and bottom cabinet panel covers by loosening the fasteners one quarter turn counterclockwise.
- Step 2:** Remove the three (3) Torx drive screws that secure the CRT cover, and then remove the CRT cover.
- Step 3:** Remove both of the plastic board guides from the top of the card cage. These guides are retained by two (2) small catches located in the two (2) holes in the left bracket of the card cage. The other ends of the guides contain slots which attach to the edge of a metal bracket. Both ends of the guides can be pried loose. The rear guide is also secured into place with a Torx screw.

Memory Management Unit Circuit Board A15

- Step 4:** Disconnect connectors J52, J53, J57 and J83 from the MMU circuit board A15. Note the position of the multi-pin connector's index triangles to ensure correct reassembly.
- Step 5:** Lift the hinged tabs (circuit board ejectors) at the front and rear edges of the Memory Management Unit circuit board A15. Pull the tabs upward until the MMU circuit board A15 separates from Mother circuit board A13. Then remove the circuit board from the instrument.
- Step 6:** Replace U140 and U150 EPROMs on the Memory Management Unit circuit board with the new microcircuits provided in this kit.
- Step 7:** Replace the MMU circuit board A15 to its former location in the card cage.

Memory Circuit Board A18

- Step 8:** Disconnect connector J77 from the Executive Processor circuit board A17. Note the position of the multi-pin connector's index triangles to ensure correct reassembly.
- Step 9:** Lift the hinged tabs (circuit board ejectors) at the front and rear edges of the Memory circuit board A18. Pull the tabs upward until the Memory circuit board A18 separates from Mother circuit board A13. Then remove the circuit board from the instrument.
- Step 10:** Replace the following EPROMs on the Memory circuit board A18 with the new EPROMs provided in this kit.

U800	U900
U810	U910
U820	U920
U830	U930

- Step 11:** Remove J350 jumper from the Memory circuit board for approximately 10 seconds. J350 jumper is located near the lithium battery.
- Step 12:** Replace J350 jumper to same position.

NOTE

During Extended Diagnostics there may be a battery error message displayed.

- Step 13:** Replace the Memory circuit board A18 to its former location in the card cage.
- Step 14:** Reconnect connectors J52, J53, J57 and J83 from the MMU circuit board A15 removed in step 4. Reconnect connector J77 from the Executive Processor circuit board A17 removed in step 8.

Time Base/Controller A5

NOTE

Position the instrument with the bottom facing the installer. The Time Base/Controller circuit board is located towards the front of the instrument. Refer to Figure 1 for circuit board locations.

- Step 15:** Replace U300, U310, U400 and U410 EPROMs with the new microcircuits provided in this kit.

Acquisition MPU Circuit Boards A25/A28

NOTE

Position the instrument with the top right side towards the installer (as viewed from the front of the instrument).

- Step 16:** Remove the Torx drive screws that secure the right-side trim covers as viewed from the front of the instrument). Then remove the trim covers.

Trim Cover Removal

Do not lift trim covers to remove them; doing so will break the trim covers. There is a clip on the inside of the trim cover which slides over the end of the side frame section. To remove the trim covers properly and prevent breakage of these covers, move each cover towards the end of the oscilloscope where it is located. (The front cover moves forward and the rear moves backward). Moving the clip about 1/8-inch will release the cover. Then, the trim cover can be removed from the oscilloscope. Refer to Figure 5, Trim and Frame removal.

- Step 17:** Remove the Torx drive screws that secure the right-side frame section to the instrument. Then remove the frame section from the instrument.
- Step 18:** Remove the long holding rod located on the top of the instrument. The holding rod secures the Acquisition Unit into the instrument. Refer to Figure 1, for holding rod location.
- Step 19:** Disconnect the coaxial cable connectors J29A, J30A, J32, J33A and J33B on the Strobe/TDR Buffer circuit board A19. Note cable locations for later reassembly.
- Step 20:** Disconnect the ribbon cable connector J34 from the Strobe/TDR Buffer circuit board A19. Note cable location for later reassembly.
- Step 21:** Disconnect the ribbon cable connector J10 from the M/F Acquisition Interconnect circuit board A26. Note cable location for later reassembly.
- Step 22:** Slide the Acquisition Unit forward about 2-inches to allow access to the Unit's rear housing.
- Step 23:** Disconnect the grounding lug located at the rear of the Acquisition Unit's rear housing.
- Step 24:** Slide the Acquisition Unit the rest of the way out of the instrument.
- Step 25:** Remove the two (2) Torx drive screws that secures each black retaining brace located on the top of the Acquisition Unit. Then remove the retaining braces from the Acquisition Unit.
- Step 26:** Pull up on the hinged tabs until the Acquisition MPU circuit board A28 separates from P8 connector on the Acquisition M/F Interconnect circuit board A26. Then remove the circuit board out of the Acquisition Unit. Also remove A25 Acquisition MPU circuit board.
- Step 27:** Replace U611, microcircuit on the Acquisition MPU circuit boards A25/A28, with the new microcircuits provided in this kit. Refer to Figure 4, for component location.

- Step 28:** Replace the Acquisition MPU circuit boards A25/A28 to their former locations in the Acquisition Unit.
 - Step 29:** Replace the black retaining braces using the hardware removed in step 10 in the Acquisition removal section.
 - Step 30:** Slide the Acquisition Unit partially into the instrument allowing the installer to reconnect the grounding lug to the unit's rear housing.
 - Step 31:** Slide the Acquisition Unit into place securing it using the holding rod removed in step 19.
 - Step 32:** Reconnect ribbon cable connectors J10 and J34 on the M/F Acquisition and Strobe/TDR buffer circuit board respectively.
 - Step 33:** Reconnect coaxial cable connectors J29A, J30A, J32, J33A, and J33B located on the strobe/TDR Buffer circuit board A19.
 - Step 34:** Replace the right-side frame section using the hardware removed in step 18.
 - Step 35:** Replace the top and bottom dust covers removed step 1.
 - Step 36:** Remove the protective backing from the 040-kit label and place it on a clean, dry area on the rear panel of the instrument. This label indicates that 040-1425-XX kit (Firmware version 4.0) has been installed.
- **New or altered measurements:** Signal to noise ratio has been added as well as new definitions of the Extinction Ratio due to changes in the industry; Jitter and Duty-cycle measurement algorithms have been enhanced to provide more accurate results; frequency domain measurements have been added (see Software FFT capability above); Topline Delta and Baseline Delta have been added to the level modes and Topline Tracking and Baseline Tracking have been added to the tracking selections.
 - **Trigger support:** 11801B and CSA803A support is present for the new trigger features: Enhanced triggering, High frequency, Trigger holdoff.

Clearing Non-Volatile Memory

After the instrument is reassembled, the non-volatile memory must be cleared before normal operation can be resumed. The memory is cleared as follows:

- Step 1:** Before pushing the ON/STANDBY switch to the ON Position, press and hold down the top two major menu buttons (WAVEFORM and TRIGGER), then push the ON/STANDBY switch to the ON position.
- Step 2:** Continue pressing the WAVEFORM and TRIGGER major menu buttons until all the LEDs beside the major menu buttons are lighted (about 6 to 7 seconds), then release the buttons.

When the power-up self-test is complete and normal operation resumes, the following message will appear at the top of the display screen:

Teksecure Erase Memory Status: Erased; Instrument ID, on-time, and number of power-ups retained.

A Word About Manuals

This firmware kit may is used in the 11801A or 11801B or CSA803 and CSA803A instruments. With this firmware release the same set of manuals are provided regardless of instrument type:

- **1180F01:** 11801B User Manual. Applies to 11801A.
CSA803A and 11801B Programmer Manual. Applies to 11801A.
- **CSA8F01:** CSA803A User Manual. Applies to CSA803.
CSA803A and 11801B Programmer Manual. Applies to CSA803.

The new manuals still apply if upgrading an 11801A or CSA803. The instrument specifications for the 11801A, 11801B, CSA803 and CSA803A are listed separately in Appendix B.

Please note that the following features are unique to the hardware in the 11801B and CSA803A: These features are not available in the 11801A and CSA803.

- Enhanced trigger On/Off
- High Frequency On/Off
- Trigger Holdoff

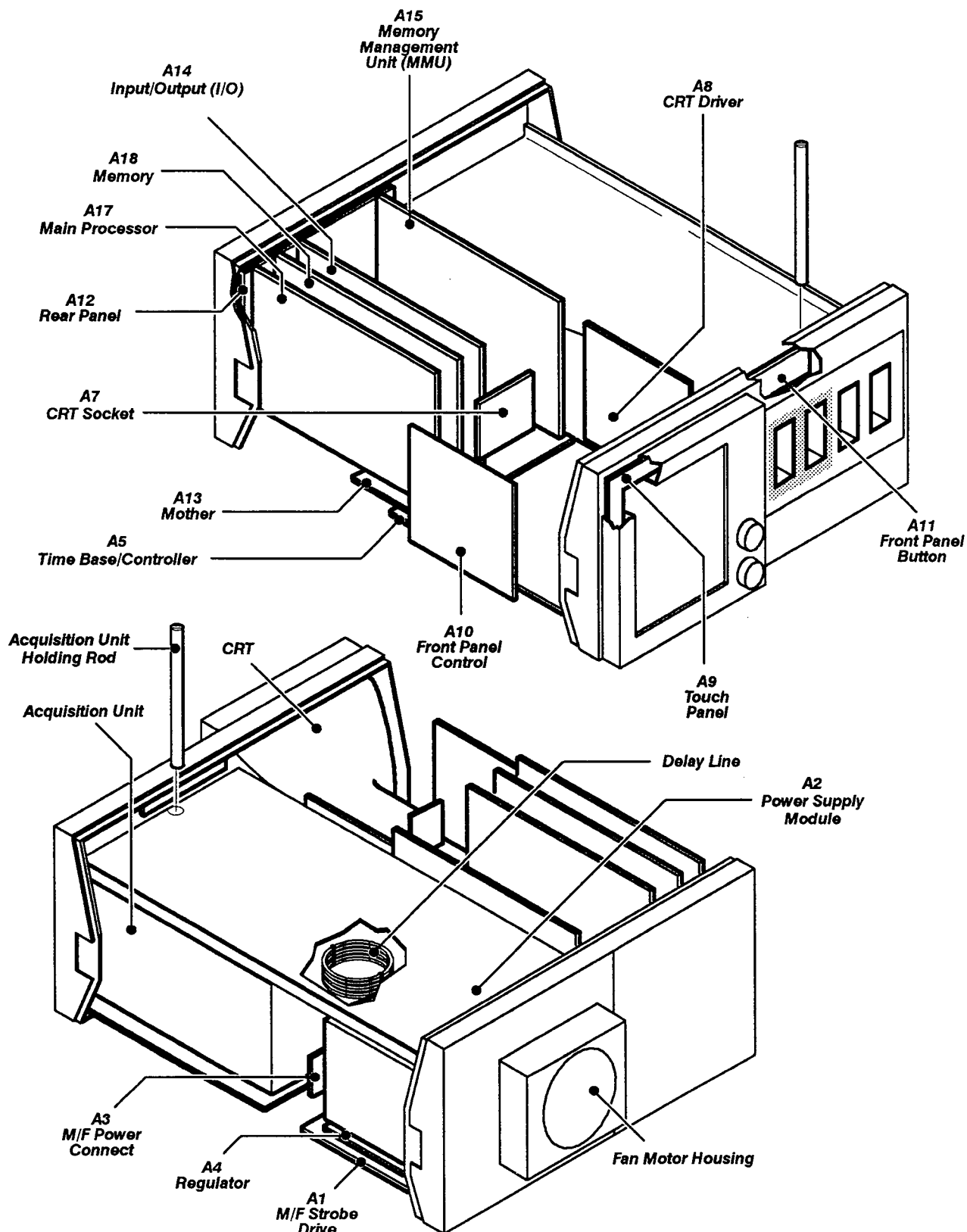


Figure 1: Mainframe Circuit Board Locations

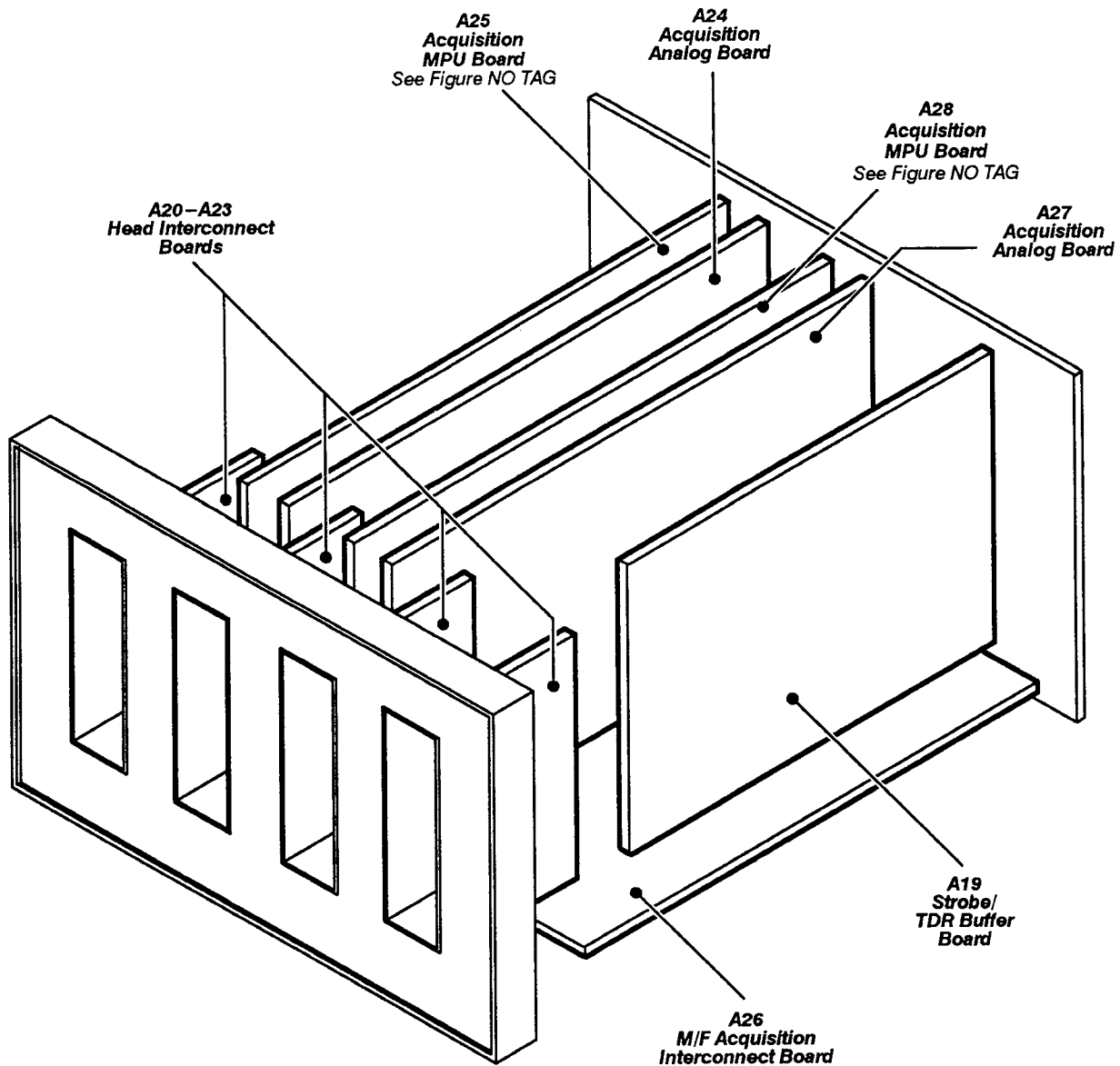


Figure 2: 11801A: Acquisition Unit Circuit Board locations.

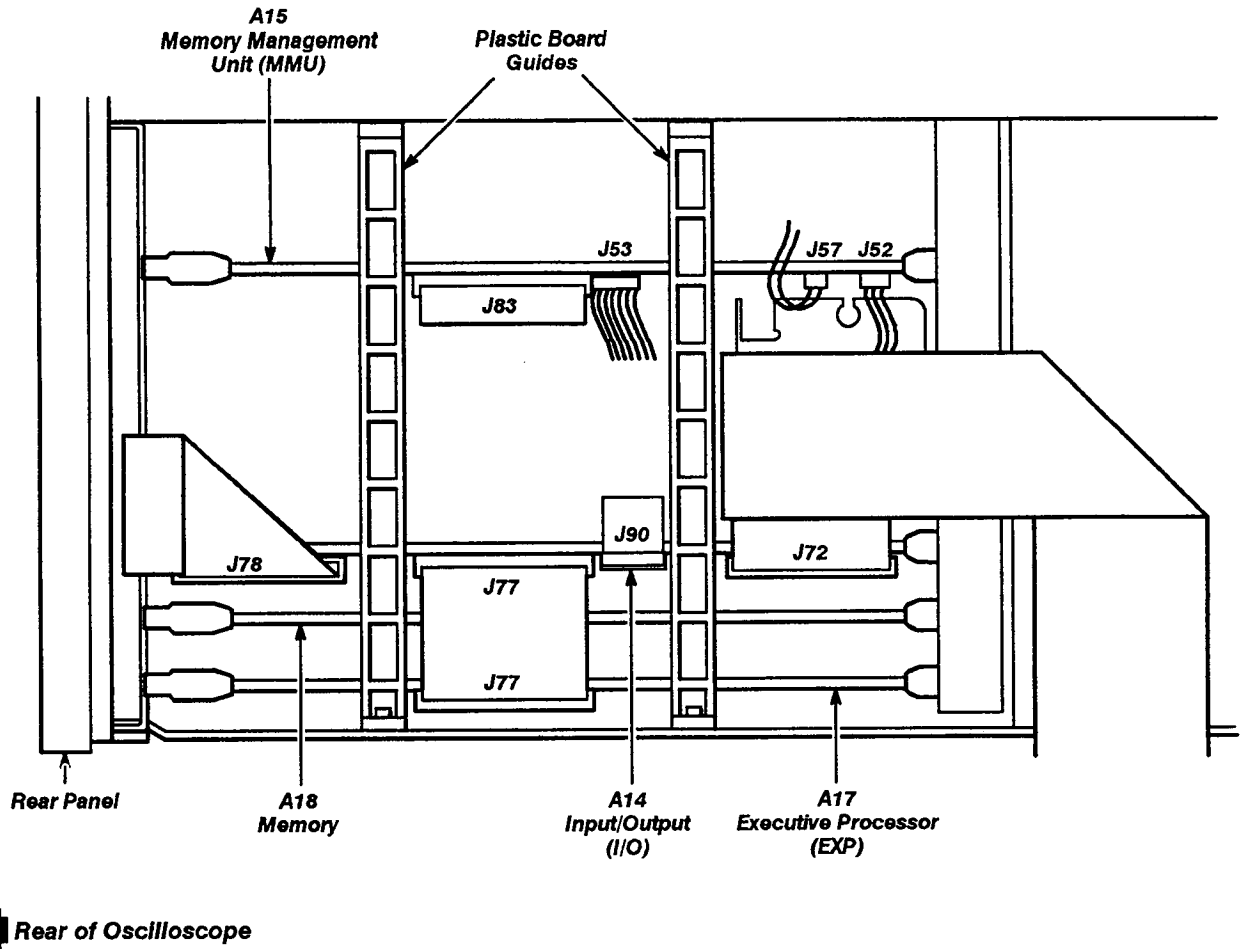


Figure 3: Top View of the Card Cage

FRU IC Detail

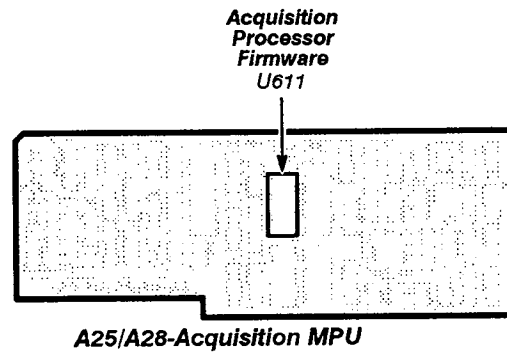
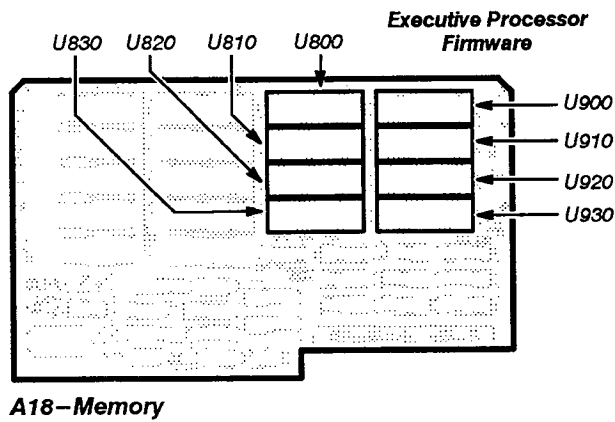
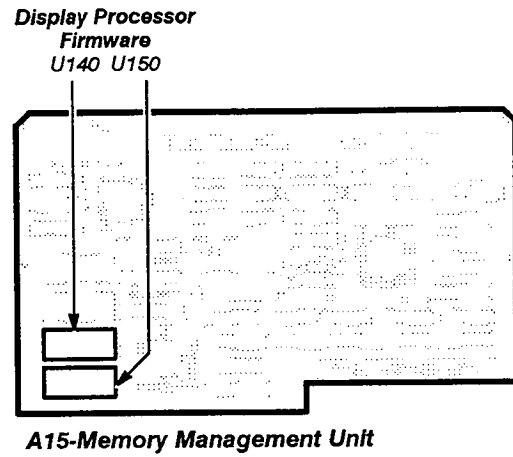
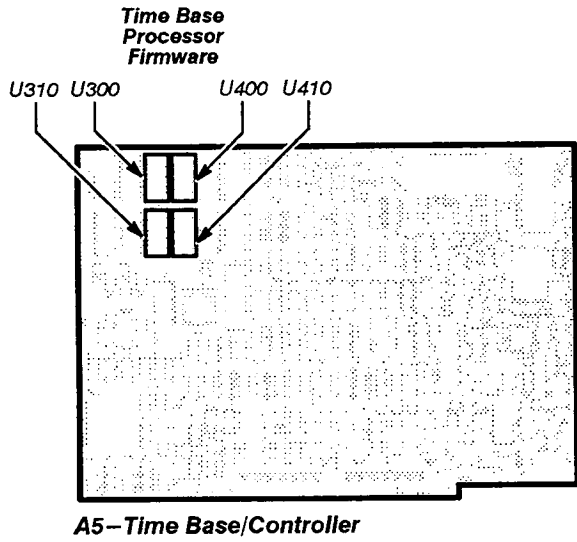


Figure 4: EPROM Locations

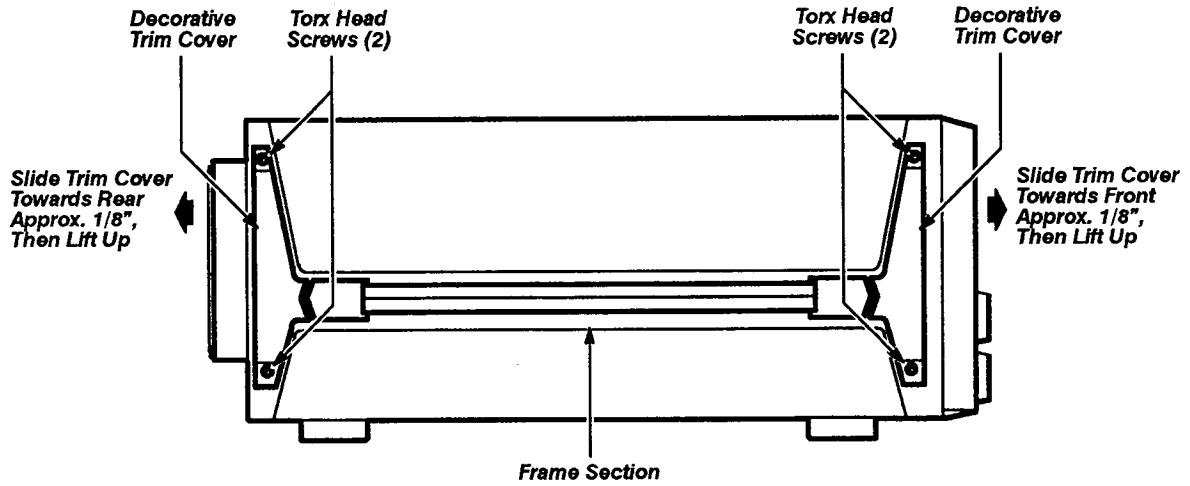


Figure 5: Trim and Frame Removal

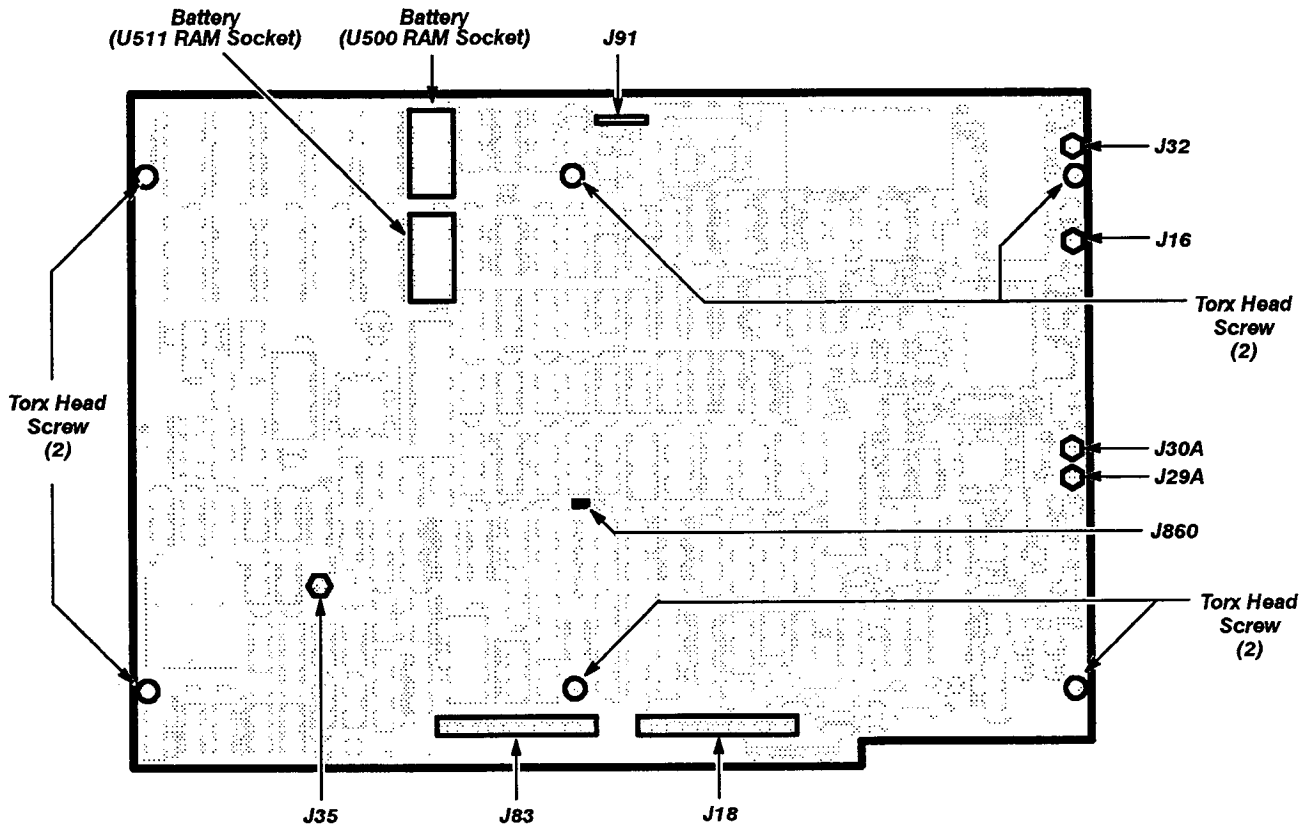


Figure 6: Time Base/Controller Circuit Board A5.

New 1180F01 Features for Version 4.0

NOTE

Version 4.0 has the following new features:

- **Standard Telecommunications Masks:** Industry standard telecommunications masks/templates have been added for many popular standards (38 total), including SDH/SONET, STS-1, STS-3/STM-1, STS-12/STM4, OC-36/OC-48, FDDI, DSX standards, CEPT standards, and others, Autoset has been customized for each standard to automatically scale to the standard mask.
- **Non-volatile memory:** Non-volatile storage for stored traces is now provided in the oscilloscope. Memory is dynamically allocated between waveform storage and settings storage, depending on needs, so that more than 10 stored settings are now allowed. Time/date stamp is provided for stored traces.
- **Software FFT capability:** FFT magnitude and FFT phase are provided at the push of a button for frequency domain information. New measurements have been added for spectral frequency, spectral magnitude, and total harmonic distortion.
- **Printer support:** TIFF and TIFF compacted data formats have been added for hardcopy data formats.
- **Filter function enhancements:** Causal phase shift may be selected for the algorithm used for the filter and smooth functions.
- **New or altered measurements:** Signal to noise ratio has been added as well as new definitions of the Extinction Ratio due to changes in the industry; Jitter and Duty-cycle measurement algorithms have been enhanced to provide more accurate results; frequency domain measurements have been added (see Software FFT capability above); Topline Delta and Baseline Delta have been added to the level modes and Topline Tracking and Baseline Tracking have been added to the tracking selections.
- **Trigger support:** 11801B and CSA803A support is present for the new trigger features: Enhanced triggering, High frequency, Trigger holdoff.

NOTE

Version 3.0 firmware are no longer available. All features in 3.0 and older are incorporated in version 4.0.

Version 3.0 Features

- Direct, automatic Jitter and Noise measurements: For the first time in a signal analysis instrument, jitter and noise can be automatically measured. Controls are provided to select RMS or peak-to-peak, adjust left and right limits, select tracking on/off and absolute or relative positions. For eye-diagrams, you may select either the eye-crossing of the mesial level for the jitter measurement location. Either topline or baseline can be selected for the noise measurements.
- New Measurement mode allows automatic pulse parametric measurements on eye-diagrams. Until now, automatic timing measurements were not possible on eye diagrams. With the introduction of the new statistical measurement mode (available only in the color graded display mode), you now can make all automatic pulse parametric measurements directly on eye diagrams. This is another Tektronix first!
- Extinction Ratio and Amplitude measurements have been added to the list of measurements that were already available in the 11801.
- A new conditional acquire mode for mask counting has been added to allow users to stop when either individual mask counts to total mask counts each a user set value.
- A new pop-up in the display modes menu shows the sample density assigned to each color in a color graded display.
- A new selection in the sampling head functions menu allows the user to automatically scale instrument readouts (axis labels, measurements, etc.) for external attenuators or amplifiers.
- A new command to turn off the initial color graded screen update has been added. This command is available only through the programmable interface. Avoiding the first upgrade allows the instrument to acquire and process data instead of updating the screen.
- A command to suppress screen update (by setting refresh rate to zero) for all color graded and statistical data base information has been added to speed up measurement throughput. Refresh rate can be set to zero only through the key pad and programmable interfaces i.e., GPIB and RS-232-C.