



## DISASSEMBLING AND ASSEMBLING

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## 10.0 DISASSEMBLING AND ASSEMBLING

### 10.1 REMOVING THE INSTRUMENT COVERS

See chapter 5, section 5.2.

**WARNING:** The opening of the covers exposed live parts and also accessible terminals may be live.  
The instrument shall be disconnected from all voltage sources before any replacement or maintenance or repair, during which the instrument will be opened.  
Capacitors inside the instrument may still be charged, even if the instrument has been separated from all voltage sources.



To avoid shocks the high voltage capacitor C4616 on POWER 2 unit A20 at the inner side of the rearpanel has to be discharged. This can be done by connecting a 1 Mohm resistor from the node of capacitor C4616 and the EHT transformer D4601 to the chassis of the oscilloscope. This node is marked with an X in figure 10.1.

The E.H.T. cable is permanently connected to the E.H.T. unit (disconnection at C.R.T.).

When the E.H.T. cable to the post-acceleration anode of the C.R.T. is disconnected at the C.R.T. end, the E.H.T. cable must be discharged immediately by shortening it to the chassis of the oscilloscope.

### 10.2 REPLACEMENTS

#### Standard parts

Electrical and mechanical replacement parts can be obtained through your local Philips organisation or representative. However, many of the standard electronic components can be obtained from other local suppliers.

Before purchasing or ordering replacement parts, check the parts list for value tolerance, rating and description.

**NOTE:** Physical size and shape of a component may affect instrument performance, particularly at high frequencies. Always use direct-replacement components, unless it is known that a substitute will not degrade instrument performance.

#### Special parts

In addition to the standard electronic components, some special components are used.

These components are manufactured or selected by Philips to meet specific performance requirements.

### Transistors and integrated circuits

Transistors and integrated circuits should not be replaced unless they are actually defective. If removed from their sockets during routine maintenance return them to their original sockets. Unnecessary replacement or switching of semiconductor devices may affect the calibration of the instrument.

When a transistor is replaced, check the operation of the part of the instrument that may be affected.

**WARNING:** Handle silicone grease with care. Avoid getting silicone grease in the eyes. Wash hands thoroughly after use.

Any replacement component should be of the original type or a direct replacement. Bend the leads to fit the socket and cut the leads to the same length as on the component being replaced.

## 10.3 REMOVING THE PLUG-IN PRINTED CIRCUIT BOARDS

The plug-in boards are:

- A1 Final amplifier
- A2 Display dac
- A3 Display control
- A4 Display memory
- A5 GRAM
- A6 UP board
- A7 Option (Interface)
- A8 DPU control
- A9 DPU
- A10 Option
- A11 ADC + T&H

These plug-in units can easily be removed (after removing the bracket and the various cables) with the aid of the red handles.

If a plug-in board is removed it can be placed on an extension board to do measurements.

For more information about the extension board see section 13.3.3.

**WARNING:** The plug-in boards have to be replaced at the correct locations to prevent damage.

## 10.4 REMOVING AND MOUNTING THE REAR PANEL

- Take security measures (see section 10.1).
- Unscrew the four screws marked with A in figure 10.1.
- Unscrew the four opposite screws at the bottom side.

**WARNING:** If the screws are removed the oscilloscope may not stand on its rear side.

- Unscrew the two screws marked with B.
- Unscrew the remaining opposite screw at the bottom side.
- Pull the rear panel out of the oscilloscope and lay it down. It may be necessary to shift through the E.H.T. cable to the C.R.T.

In this situation the oscilloscope can operate and measurements can be done.

Because connector X4604 of unit A20 is disconnected, the high voltage is not present, so nothing can be seen on the screen.

Also the power supply is not fully loaded, because the distribution unit A53 is not connected.

To test the power supply under full load, the extension board for the plug in units can be used as shown in figure 10.2.

It is also possible to use a dummy load.

This is specified in section 13.2.

**WARNING:** If the oscilloscope is operating, parts of POWER 1 unit A19 are at mains potential.

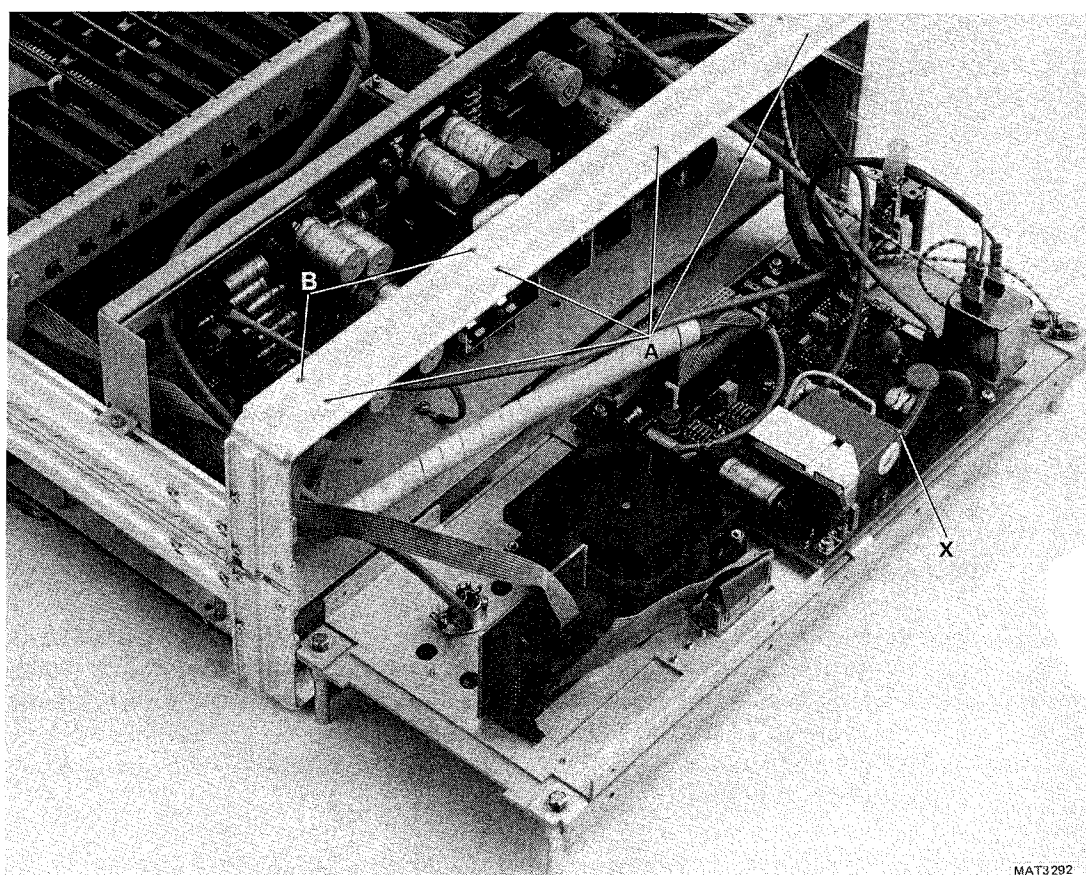


Figure 10.1 Removing the rear panel.

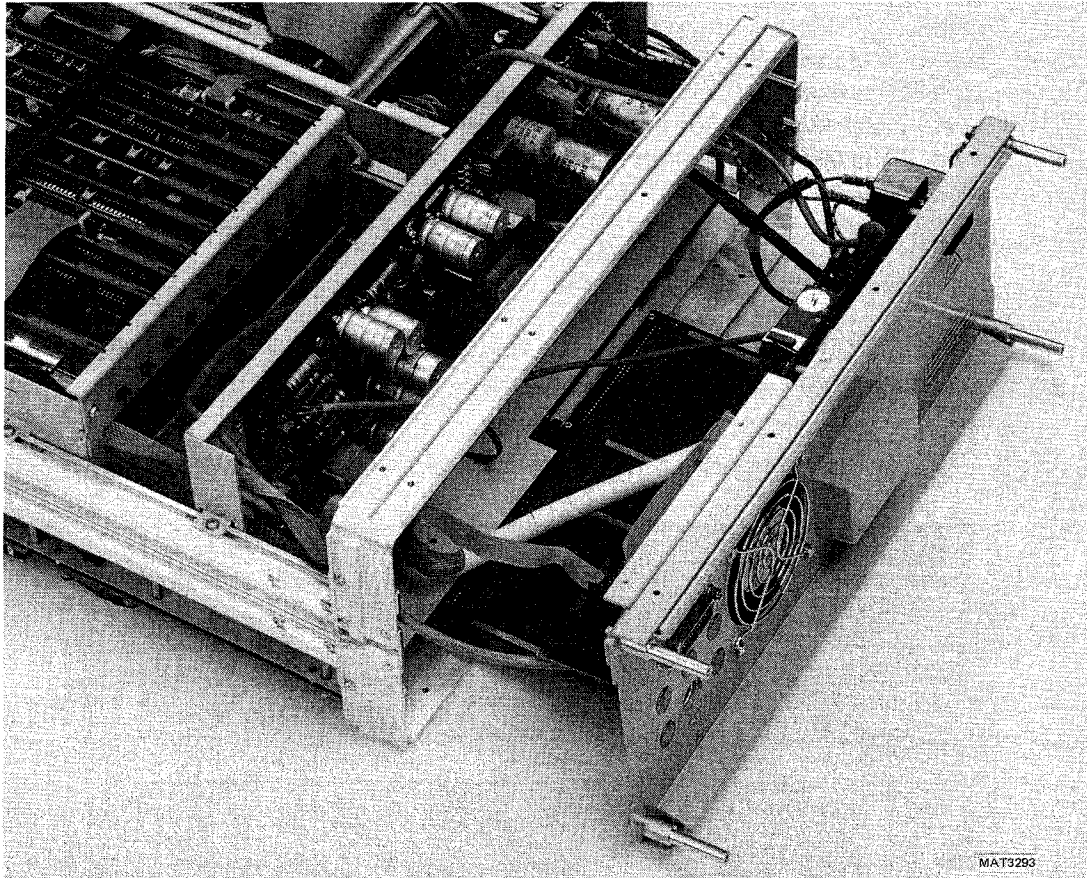


Figure 10.2 Use of the extension board for the rear panel.

To reinstall the rear panel the above mentioned steps have to be done in reverse order.

Special attention is asked for:

- The cable from the mains switch to connector X4401 on unit A19 has to be positioned as much as possible between capacitors C4416 + C4417 and the side of the oscilloscope, to pick up the less interference from transformer T4401.
- The high voltage cable from the E.H.T. transformer should not touch transistor V4612.

## 10.5 ACCESS TO THE TRIGGER CONTROL UNIT

To get access to the trigger control unit A34 the three stage trigger unit A32 can be turned up as shown in figure 10.3.

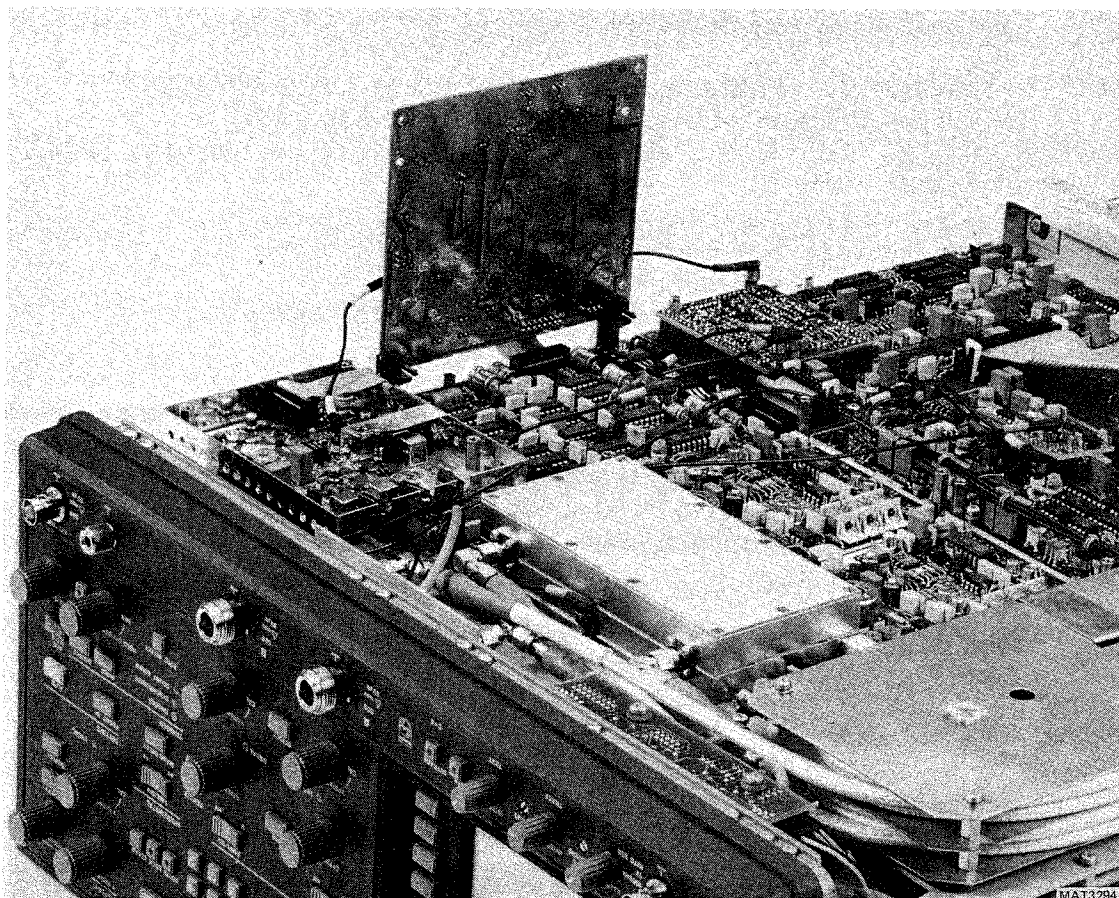


Figure 10.3 Access to trigger control unit.

The three stage trigger unit can be turned up as follows:

- Disconnect all coax cables to this unit.
- Unscrew the four fixation screws.
- Turn the unit up and place it on the two supports as shown in figure 10.3.

In this position the oscilloscope can operate, but will not function properly. Nevertheless certain measurements can be done on the trigger control unit A34.

To reinstall the boards the steps have to be done in reverse order. Care should be taken of the reconnection of the coax cables at the right points. The cables should also be repositioned as much as possible to their original positions.

- Notes:
- If one of the coax cables should be replaced care should be taken that the length difference between this cable and cables with similar signals (e.g. balanced signals) is less than 1 cm, to avoid delay time differences.
  - Section 15.3.2 supplies ordering information for longer coax cables.

## 10.6 REMOVING THE GATE UNIT, THE TRIGGER INPUT UNIT AND THE TRIGGER PICK-OFFS.

### 10.6.1 Removing the gate unit (unit A54)

The gate unit (inclusive the aluminium housing) can be removed as follows (see figure 10.4):

- Unplug all wiring from the vertical signal unit A55.
- Remove the two shielding plates from unit A55.
- Unplug the two rectangular SMA connectors at the gate housing, marked with A.
- Unscrew the fixation screws of A55 marked with B.
- Remove unit A55 completely from the instrument.
- Turn the unit upside down.
- Unscrew all fixation screws of the gate housing.

To reinstall the gate unit the steps have to be done in reverse order. When the gate unit is placed on the vertical signal unit, care should be taken not to clamp the resistors just beside the connectors of the gate unit (see also section 8.54.2). Care should also be taken of the reconnection of the coax cables at the right points. The cables should also be repositioned as much as possible to their original positions.

**WARNING:** The gate p.c.b. can be bended easily, which causes broken soldering joints.  
Please handle carefully!

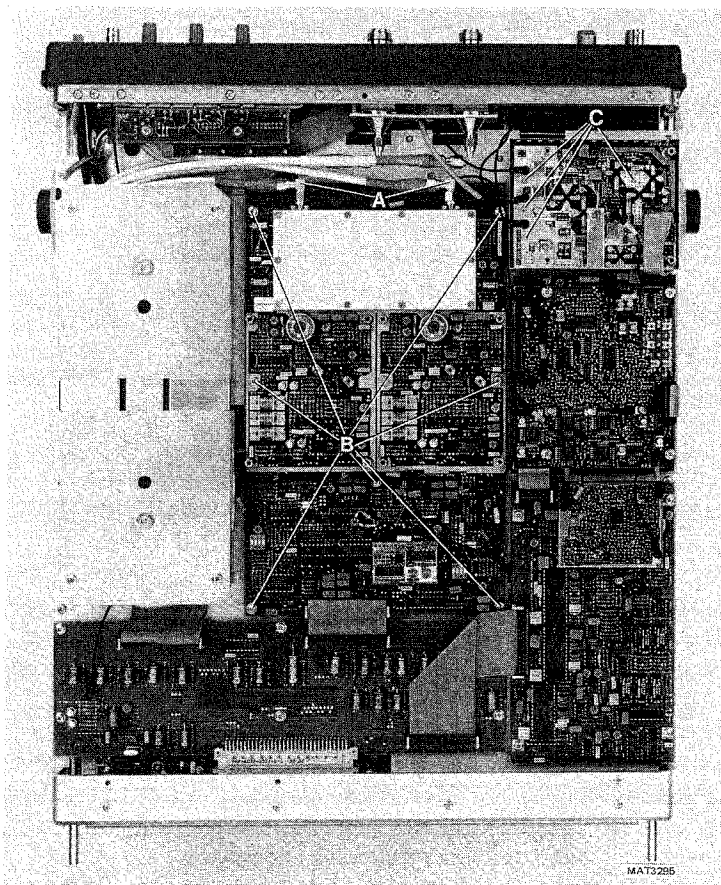


Figure 10.4 Bottom side of the oscilloscope.



### 10.6.2 Removing the trigger input unit (A31)

The trigger input unit can be removed as follows (see figure 10.4):

- Remove the shielding plate (5 screws)
- Unplug all wiring from the unit.
- Unscrew the distance pieces on the p.c.b.
- Unscrew all fixation screws of which some are marked with C.
- Remove the unit.

**WARNING:** The p.c.b. can be bended easily, which causes broken soldering joints.  
Please handle carefully!

### 10.6.3 Removing the a trigger pick-off

A trigger pick-off can be removed as follows:

- Remove the complete front unit (see section 10.7.1).
- Unscrew the two fixation screws of the bracket over the trigger pick-offs.
- Disconnect the delay line from the trigger pick-off.
- Disconnect the coax cables of the trigger pick-off signal from the trigger input unit A31.
- Disconnect the trigger pick-off from the N-SMA input socket and remove it.

To reinstall the trigger pick-off the steps have to be done in reverse order.

Note: When the trigger pickoff is placed on the N-SMA input connector, it should be prevented that the central pin inside the input connector is shifted outside, e.g. by fitting the N-BNC adaption connector on the input connector.

## 10.7 REMOVING THE FRONT UNIT

### 10.7.1 Removing the complete front unit

- Remove the two screws A (figure 10.5) at the upper side of the front unit.
- Slacken the two screws B.
- Carefully press the front unit via the front side out of the instrument.
- Disconnect the two flatcable connectors from the front unit.
- Remove six screws to remove the cover from the front unit.

### 10.7.2 Removing the knobs of the rotary controls

- Remove the knob cover.
- Slacken the internal nut.
- Pull off the knob.

## 10.7.3 Removing the textplate

- Remove the complete front unit as described in section 10.7.1.
- Remove all the knobs of the rotary controls (see in section 10.7.2).
- Remove the four special screws which fix the textplate to the unit.  
This can be done with a special tool for slotted nuts as described under section 13.3.2.
- Remove the textplate.

NOTE: For a repair of a defective rotary control the textplate has not to be removed. Only the p.c.b. with the leds and the fototransistors has to be removed then.

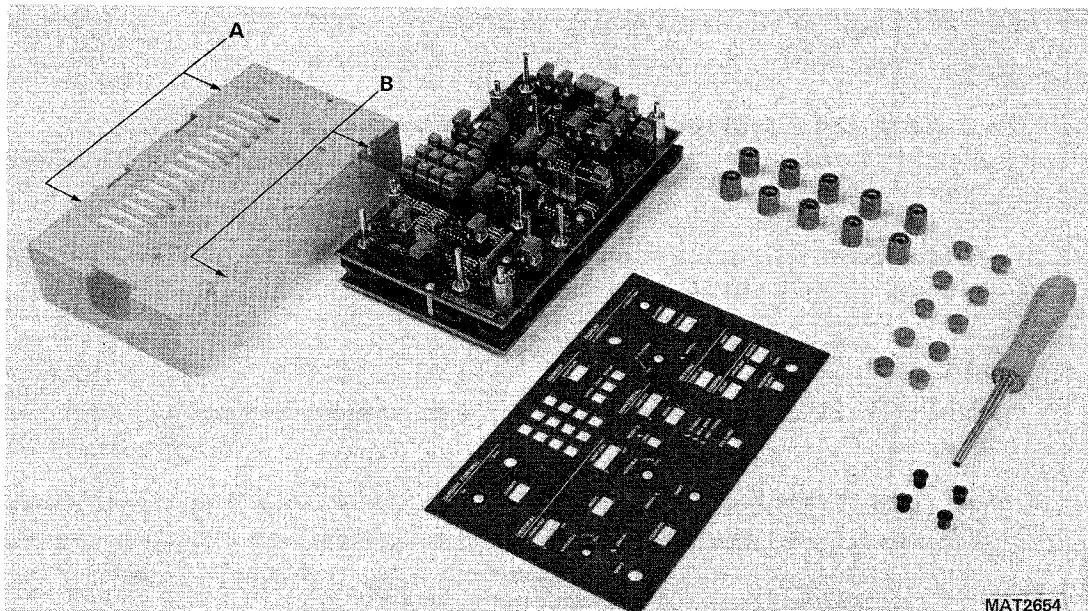


Figure 10.5 Disassembled front unit.

## 10.8 REMOVING THE C.R.T. CONTROL UNIT (A16 + A18)

- Remove the three C.R.T. control knobs as follows:
  - Remove the knob covers.
  - Slacken the internal screws.
  - Pull the knobs off.
- Remove the electrical wiring.
- Unscrew the two fixation screws on the front profile and pull the unit backwards.

NOTE: When reinstalling the unit take care off the correct position of the marks on the caps of the knobs.

### 10.9 REMOVING THE SOFTKEY UNIT (A17)

- Remove the front unit as described in section 10.7 until the unit is from the instrument and remove the bezel and the contrast filter.
- Remove the caps from the softkeys (8x).
- Unscrew the two fixation screws of the unit and unscrew the fixation screws of the brackets inside the front panel hole.
- Remove the brackets.
- Disconnect the flatcable from the unit and remove it.
- Remove the unit towards you.

### 10.10 REMOVING AND INSTALLING THE CATHODE RAY TUBE

- Disconnect flatcable connector X3001 (trace rotation coil) on the C.R.T. control unit A16.
- Remove the rear panel as described in section 10.4.
- Remove the bezel and the blue contrast filter.
- Remove the management unit A25.
- Remove the Z-amplifier unit A15.
- Remove the C.R.T. illumination set (1 screw).
- Slacken the tighten bolt of the C.R.T. pressing plate. This can be done through the hole in the partition on which unit A19 is mounted.
- Remove the pressing plate.

Now the C.R.T. is only fixed by a fork piece at the front end of the C.R.T., which on its turn is pressed by a wedge. The two screws that fix the fork and the wedge can be found in the right top corner above the front side of the C.R.T. The screw that is most right up fixes the wedge; the screw that is left below it fixes the fork piece.

- Slacken the screw of the fork piece.
- Slacken the screw of the wedge.
- Pull the C.R.T. with the shielding cone carefully backwards.

Care should be taken that transistor V3003 on the C.R.T. control unit below the front end of the C.R.T. is not damaged.

- Unplug the E.H.T. plug and discharge the E.H.T. cable by shortening the plug to the chassis.
- Remove the C.R.T. together with the shielding cone.
- Remove the earthing wire and the small spring from the cone.
- Remove the shielding cone and the rubber cap.

To instal the C.R.T. all steps have to be done in reverse order.

## 10.11 REMOVING THE CARRYING HANDLE

- Remove the plastic profile cover, (Item 6 in figure 10.6) which is snapped on the carrying profile (5).
- Remove the four screws (8) which fix the carrying profile to the handle arms.
- Depress the locking pins (1) and turn the carrying handle as far as possible to the upper side of the oscilloscope.
- Keep the locking pin of the right handle arm depressed and pull the handle arm from its bearing.
- Remove the carrying profile from the left handle arm.
- Depress the locking pin of the left handle arm and turn the latter as far as possible to the lower side of the oscilloscope.
- Keep the locking pin depressed and pull the handle arm from its bearing.

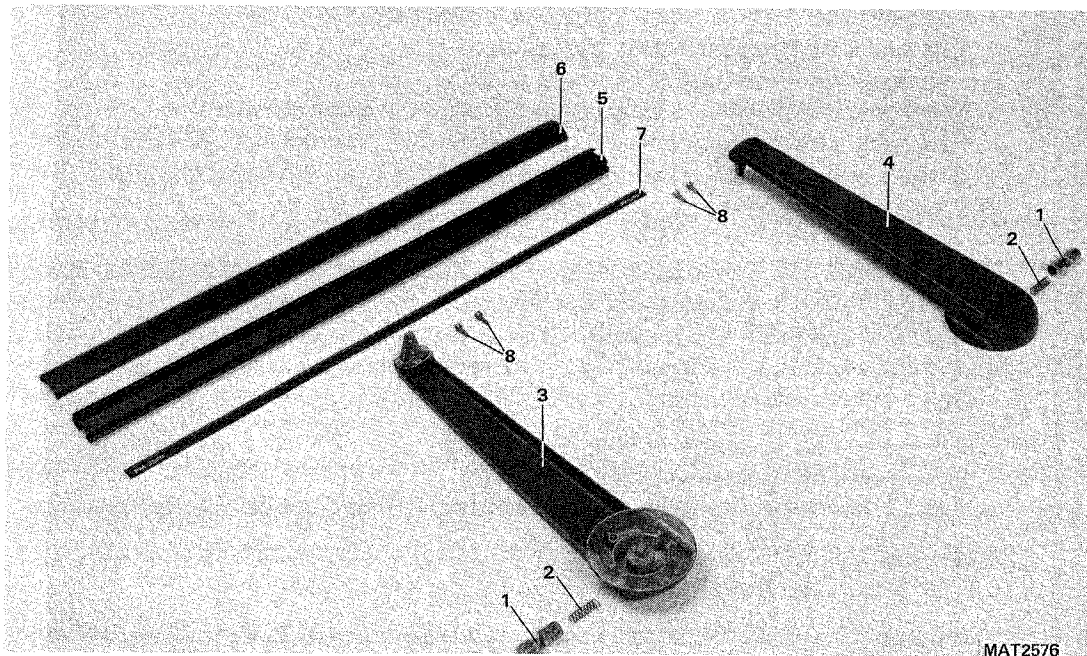


Figure 10.6 Carrying handle.