product modification

040-0553-01

Type 7000 Series

BLANK PLUG-IN

For all TEKTRONIX® Type 7000 Series Oscilloscopes

All Serial Numbers

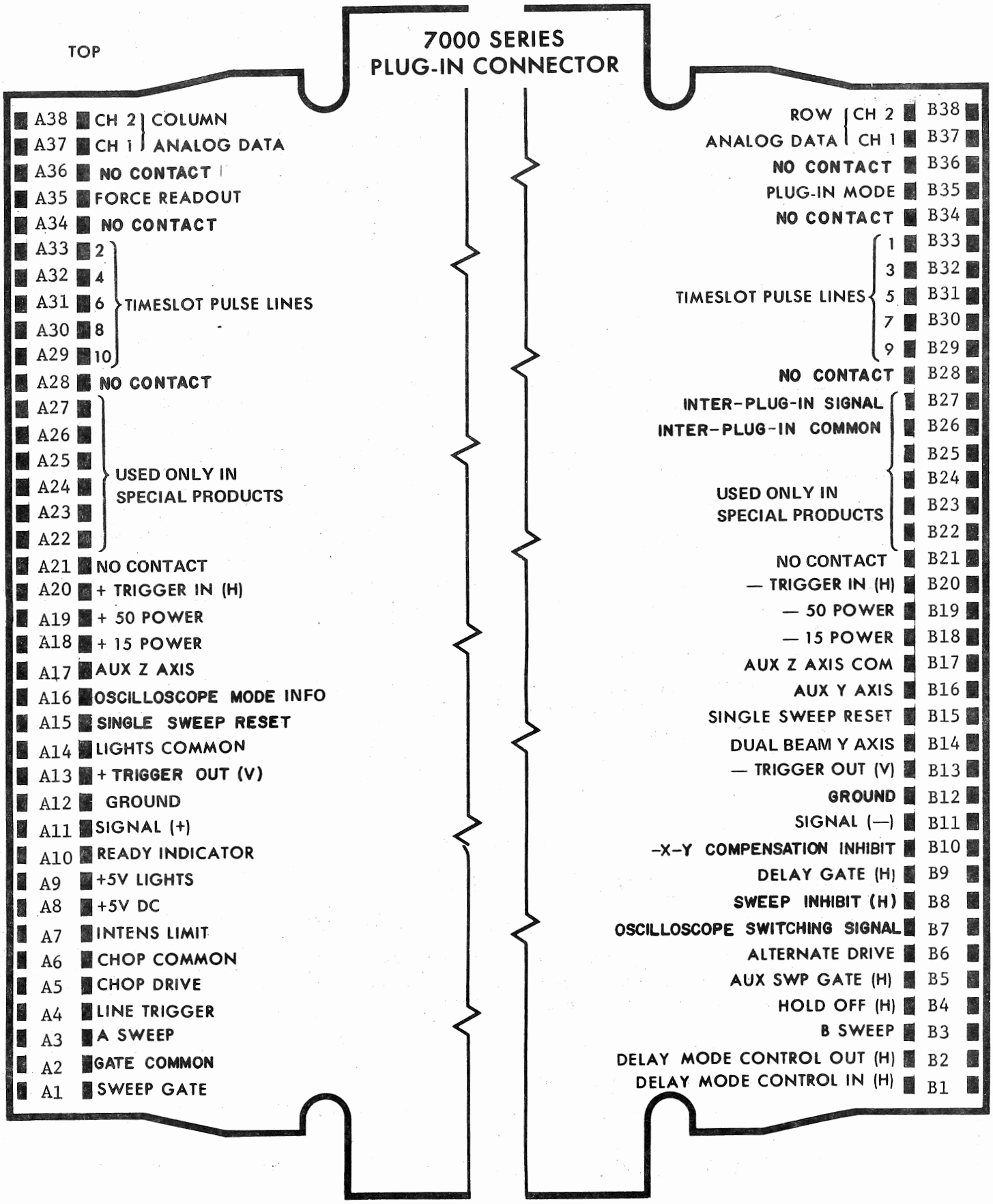
Modification Kit, PN 040-0553-01 provides the necessary mechanical parts and a blank circuit board to construct a special plug-in unit for the above instruments.

4-7-77

Supersedes: 4-26-76

PARTS INCLUDED IN MODIFICATION KIT:

Quantity	Part Number	Description
1 ea	105-0075-00	Bolt, latch, plastic
1 ea	105-0076-02	Release bar, latch
5 ea	211-0105-00	Screw, 4-40 x 0.188 100° FH
5 ea	211-0116-00	Screw, sems 4-40 x 0.312 PHB
8 ea	213-0192-00	Screw, thread forming 6-32 x 0.5 Fil
1 ea	214-1054-00	Spring, flat, latch detent
1 ea	214-1061-00	Spring, flat, sliding ground
1 ea	214-1095-00	Pin, spring
1 ea	214-1280-00	Spring, helical
5 ea	220-0547-01	Nut, block
1 ea	333-1367-00	Panel, front, blank
2 ea	337-1064-04	Shield, electrical
2 ea	348-0235-00	Shielding gasket
1 ea	366-1058-00	Knob, latch
1 ea	386-1402-00	Panel, rear
1 ea	386-1447-47	Sub-panel, front
1 ea	388-1699-00	Circuit board, vector
1 ea	426-0499-12	Frame section, bottom
1 ea	426-0505-04	Frame section, top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A35 FORCE READOUT
A34 NO CONTACT
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A32 4
A31 6 TIMESLOT PULSE LINES
A30 8
A29 10
A28 NO CONTACT
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A23
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USED ONLY IN SPECIAL PRODUCTS B23
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SIGNAL (—) B11
-X-Y COMPENSATION INHIBIT B10
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POWER SUPPLY VOLTAGES

Voltage	Contact No.	Maximum Current Avail Per Plug-in*	NOTES
+5V ±3%	A-8	500mA	Maximum allowable di/dt = 10mA/μs
+5V LIGHTS	A-9	750mA	Front Panel lights only--current must be returned via A-14 (lights common). This voltage is not tightly regulated. The control illum switch can reduce and turn off this supply.
+15V ±3%	A-18	500mA	Maximum allowable di/dt = 10mA/μs
-15V ±3%	B-18	500mA	Maximum allowable di/dt = 10mA/μs
+50V ±3%	A-19	100mA	Maximum allowable di/dt = 10mA/μs
-50V ±3%	B-19	100mA	Maximum allowable di/dt = 10mA/μs

* The total power acquired from mainframe power supplies and dissipated within any one plug-in must not exceed 16.5 watts. (This means that all supplies can not be required to supply their maximum currents simultaneously.)

INPUTS TO MAINFRAME

A-11 (+) and B-11 (-) SIGNAL (DISPLAYED)

A-11 and B-11 differentially provide signal input to the mainframe.

A positive signal on pin A-11 or a negative signal on pin B-11 deflects trace up in the vertical channels and to the right in horizontal channels. All signal channels are direct coupled.

Deflection Factor----------50mV/displayed division ±1%

Maximum Signal Limits----------±30 division (±1.5V)

Usable Signal Limits----------±15 divisions or less (±0.75V or less)

Input Impedance (B-11 to A-11)--100Ω (50Ω each side to ground)

GROUND RETURNS (COMMONS)

A-2 GATE COMMON

Use as a ground reference when amplifier plug-in units are used in horizontal plug-in compartments.

Not to be used as a signal ground reference. It should be connected to the plug-in rails inside the plug-in to provide a lower impedance for gate currents.

A-6 CHOP COMMON

Used to return any current drawn from A-5 (Chop Drive), B-6 (Alternate Drive) and B7 to the mainframe.

This line is grounded in the mainframe and should not be connected to ground in the plug-in.

A-12 -- B-12 GROUND

To be used only for reference for signals coming from the plug-in.

A-14 LIGHTS COMMON

All current taken from pin A-9 (Lights) must be returned to the mainframe Via this contact.

B-17 AUXILIARY 'Z' AXIS COMMON

Reference for Auxiliary 'Z' Axis signals sent to the mainframe.

INTERFACE CONTACT FUNCTIONS

A-1 SWEEP GATE (HORIZONTAL)

Generated by time base plug-in and is used in the mainframe to generate unblanking signals for the CRT, front panel signal (Gate Out), triggers divide-by-two voltage calibrator, and for use by Horizontal logic.

Plug-ins that do not generate a gate should connect A-1 to +5V (A-8) to unblank the CRT when the plug-in is used in the horizontal compartments. For high frequency gate currents A-2 and the plug-in rails should be used for Gate common.

B-1 DELAY MODE CONTROL IN (B-HORIZONTAL)

The trigger override B-1 is used by the delayed sweep in conjunction with the delay gate (B-9) to produce proper delayed sweep operation.

When not used it should be left open.

A-2 GATE COMMON

Use as a ground reference when amplifier plug-in units are used in horizontal plug-in compartments.

B-2 DELAY MODE CONTROL OUT (A-HORIZONTAL)

The delay control is generated by delaying sweeps and is used by the mainframe and the delayed sweep when the delaying sweep is operating in the A Horizontal compartment. This signal is connected to B-1 of the B Horizontal compartment. Delay Control indicates whether in delay mode or normal, and is used by the delayed sweep to enable the "triggerable" or "runs after" sweep modes.

If Delay Control is not provided, B-2 should be connected to ground.

A-3 A-SWEEP

Horizontal sweep plug-ins normally supply a negative going sawtooth to left and right vertcal plug-in compartments. See mainframe schematic.

Leave open when not used--------Nominally 0V to -5.25V

B-3 B-SWEEP

Horizontal sweep plug-ins normally supply a negative-going sawtooth to left and right vertical plug-in compartments. See mainframe schematic.

Leave open when not used.

A-4 LINE TRIGGER (HORIZONTAL)

Provides Line frequency triggers to all interface connectors.

Approximately 3.0V P-P (unloaded) MAXIMUM loading per plug-in $\geq$ 10kΩ.

Use A-12 Ground return.

B-4 HOLDOFF (HORIZONTAL)

Originates in the timebase plug-in and is used by the mainframe to derive an "alternate" switching signal (B-6).

A-5 CHOP DRIVE

Generated by the mainframe and is used by dual-channel plug-ins to chop between channels.

Chop Drive is always present. Use A-6 for ground return.

B-5 AUXILIARY SWEEP GATE (HORIZONTAL)

Generated only by dual sweep plug-ins.

Not used by all mainframes.

A-6 CHOP COMMON

Used to return any current drawn from A-5 (Chop Drive), B-6 (Alternate Drive) and B7 to the mainframe.

B-6 ALTERNATE DRIVE

Generated by the mainframe to be used by dual channel plug-ins in the alternate mode to switch between channels.

Chop Common A-6 should return any current used by B-6.

A-7 INTENSITY LIMIT (HORIZONTAL)

Used to avoid burning the CRT phosphor at slow sweep rates.

A-7 should be connected to a common (A2, B17, Rails) at sweep rates of 0.1 s/Div and slower. It should be left open at all other sweep rates.

B-7 OSCILLOSCOPE SWITCHING SIGNAL

Oscilloscope mode information is used by the plug-ins to determine when they are being displayed. This information is necessary when Aux 'Z' Axis is being used to insure that only the displayed plug-in is controlling the 'Z' Axis.

The mainframe delay line must be considered when using these signals. Chop Common A-6 should return all current used by Mainframe Switch Signal B-7.

A-8 POWER SUPPLY

+5V ±3% 500mA

B-8 SWEEP INHIBIT (HORIZONTAL)

Originates in the mainframe and is derived from the Delay Gate B-9.

A-9 POWER SUPPLY

+5V Lights 750mA

INTERFACE CONTACT FUNCTIONS (continued)

B-9 DELAY GATE (A HORIZONTAL)

Generated by any delaying sweep plug-in when used in a delaying mode. Delay Gate is used by the delayed sweep in the B Horiz compartment only when the delaying sweep is used in the A Horiz compartment.

Plug-ins which do not generate this gate should connect B-9 to A-2.

A-10 READY INDICATOR

A-10 is used by the mainframe to determine if a sweep is ready to run in the single sweep mode. Intended to light a #49 light bulb at a remote location via J1075.

B-10 X-Y COMPENSATION INHIBIT (HORIZONTAL)

When the mainframe is supplied with an X-Y Delay Compensation Network (option 2), grounding B-10 will cause the appropriate delay to be added to the horizontal signal. B-10 should be grounded via pin A-2 for amplifiers. It should be left open for time bases.

A-11
B-11 SIGNAL (DISPLAYED)

A-11 and B-11 differentially provides signal input to the mainframe.

A-12
B-12 GROUND

To be used only for reference for signals coming from the plug-in.

A-13 (+)
B-13 (-) TRIGGER OUT (VERTICAL)

Trigger signal supplied to mainframe. Same signal requirements as A-11 and B-11.

A-14 LIGHTS COMMON

All current taken from pin A-9 (Lights) must be returned to the mainframe via this contact.

B-14 NOT USED

INTERFACE CONTACT FUNCTIONS (continued)

A-15 SINGLE SWEEP RESET

Sweep plug-in supplies logic informing mainframe that sweep(s) are in single sweep mode. Not used in all mainframes.

B-15 SINGLE SWEEP RESET (HORIZONTAL)

Resets sweep plug-ins in single sweep mode.

A-16 OSCILLOSCOPE MODE INFO

Oscilloscope mode information is used by the plug-ins to determine when they are being displayed. This information is necessary when Aux 'Z' Axis is being used to insure that only the displayed plug-in is modifying the 'Z' Axis signal.

B-16 AUXILIARY 'Y' AXIS

Not used in all mainframes.

A-17 AUXILIARY 'Z' AXIS

Auxiliary 'Z' Axis permits plug-in to intensity modulate the CRT.

B-17 AUXILIARY 'Z' AXIS COMMON

Reference for Auxiliary 'Z' Axis signals sent to the mainframe.

A-18 POWER SUPPLY

+15V ±3% 500mA*

B-18 POWER SUPPLY

-15V ±3% 500mA*

A-19 POWER SUPPLY

+50V ±3% 100mA*

B-19 POWER SUPPLY

-50V ±3% 100mA*

* See chart on page 4.

A-20 (+)
B-20 (-) TRIGGER (HORIZONTAL)

Push-pull trigger signal to horizontal plug-in. Trigger signal is in phase with signal channel. Signal characteristics are essentially the same as provided to the mainframe at A-13 and B-13 from the vertical plug-in. Signal routing is determined by mainframe TRIGGER SOURCE switches.

A-21 (+)
B-21 (-) AUXILIARY TRIGGER IN (HORIZONTAL) IN EARLY INSTRUMENTS ONLY

Auxiliary triggers permit each dual-timebase the choice of triggering on either left vertical or right vertical plug-in units. Auxiliary trigger source is determined by the TRIGGER SOURCE switch associated with the adjacent horizontal compartment.

A-22 through A-27 NOT NORMALLY USED

B-22 through B-27 NOT NORMALLY USED

A-26 LOGIC COMMON IN SPECIAL PRODUCTS

A-27 -5V IN SPECIAL PRODUCTS

B-26 $\overline{\text{SND}}$ NOT IN SPECIAL PRODUCTS

B-27 +5.1V IN SPECIAL PRODUCTS

A-28 NO CONTACT

B-28 NO CONTACT

A-29 through A-33
B-29 through B-33 TIME-SLOT PULSE LINES

Each time slot pulse line (1 through 10) is consecutively pulsed with -15 volts nominal for resistive encoding of appropriate analog data lines (A37, B37, A38 and B38) for apha-numeric readout display.

Minimum allowable encoding resistance: 13kΩ. See Circuit Description Section of the oscilloscope manual.

A-34 NO CONTACT

B-34 NO CONTACT

A-35 FORCE READOUT

Readout data for plug-in can be displayed regardless of the state of the mainframe MODE pushbuttons.

Readout activated when A-35 grounded. (Use A-2 common.)

Leave open when not in use.

B-35 PLUG-IN MODE

B-35 supplies the mainframe with analog voltages to identify the operating mode of the dual-trace or dual-sweep plug-in. It is left unconnected in single trace or single sweep plug-ins. A-2 Utility Common is ground return.

A-36 NO CONTACT

B-36 NO CONTACT

A-37 CH 1 COLUMN ANALOG DATA

Supplies column data for CH 1 from the plug-in to the mainframe. Ten or more levels at 0.1mA/level in conjunction with Time Slot logic provide the mainframe with plug-in scale factor readout information. See Circuit Description Section of oscilloscope manual.

INTERFACE CONTACT FUNCTIONS (continued)

B-37 CH 1 ROW ANALOG DATA

Supplies Row Data for CH 1 from the plug-in to the mainframe. Ten or more levels at 0.1mA/level in conjunction with Time Slot logic provide the mainframe with plug-in scale factor readout information. See Circuit Description Section of oscilloscope manual.

A-38 CH 2 COLUMN ANALOG DATA

Supplies Column Data for CH 2 from the plug-in to the mainframe. Ten or more levels at 0.1mA/level in conjunction with Time Slot Logic provide the mainframe with plug-in scale factor readout information. See Circuit Description of oscilloscope manual.

B-38 CH 2 ROW ANALOG DATA

Supplies Row Data for CH 2 from the plug-in to the mainframe. Ten or more levels at 0.1mA/level in conjunction with Time Slot logic provide the mainframe with plug-in scale factor readout information. See Circuit Description of oscilloscope manual.

Index No.	Part Number	Quantity	Description
-1	366-1058-00	1	Knob, latch
-2	214-1095-00	1	Pin, spring
-3	105-0076-02	1	Release bar, latch
-4	214-1280-00	1	Spring, helical
-5	214-1054-00	1	Spring, flat latch detent
-6	105-0075-00	1	Bolt, latch, plastic
-7	333-1367-00	1	Panel, front, blank
-8	386-1447-47	1	Sub-panel, front
			Mounting hardware
	213-0192-00	4	Screw 6-32 x 0.5 Fil H
-9	348-0235-00	2	Shielding gasket
-10	426-0499-12	1	Frame section, bottom
-11	337-1064-04	2	Shield, electrical
-12	220-0547-01	5	Nut, block
			Mounting hardware not included w/nut
	211-0105-00	5	Screw 4-40 x 0.188 100° FH
	211-0116-00	5	Screw, sems 4-40 x 0.312 PHB
-13	214-1061-00	1	Spring, flat, sliding ground
-14	426-0505-04	1	Frame section, top
-15	386-1402-00	1	Panel, rear
			Mounting hardware
	213-0192-00	4	Screw, thread forming 6-32 x 0.5 Fil
	361-0326-00	1	Spacer, Sleeve
-16	388-1699-00	1	Circuit board, Vector