Switcher 410

Operation and
Maintenance Manual

HUNTRON®

HUNTRON®
SWITCHER

LIMITED WARRANTY

For a period of one year from the date of its purchase new and undamaged from Huntron Instruments, Inc. HUNTRON INSTRUMENTS, INC. will without charge, repair or replace, at its option, this product if found by it to be defective in materials or workmanship. Products purchased in the United States are to be returned to Huntron Instruments, Inc. at its factory, transportation prepaid. Products purchased outside the United States are to be returned to the source of purchase. This limited warranty is expressly conditioned upon the product having been used only in normal usage and serviced in accordance with instruction of HUNTRON INSTRUMENTS, INC. and not having been altered in any way or subject to misuse, negligence or damage, and not having been repaired or attempted to be repaired by anyone other than HUNTRON INSTRUMENTS, INC. or its authorized agents. **EXCEPT FOR THE FOREGOING EXPRESS WARRANTY OF REPAIR OR REPLACEMENT, HUNTRON INSTRUMENTS, INC. MAKES NO WARRANTY OF ANY KIND, INCLUDING BUT NOT LIMITED TO, ANY EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND HUNTRON INSTRUMENTS, INC. SHALL NOT BE LIABLE FOR ANY DAMAGES, WHETHER DIRECT OR INDIRECT, CONSEQUENTIAL OR INCIDENTAL, FORESEEABLE OR NOT, OR OTHERWISE, BEYOND REPAIRING OR REPLACING THIS PRODUCT. THIS WARRANTY IS NOT APPLICABLE TO EXTERNAL CABLES, CLIPS, WIRING OR POWER SUPPLY.**

CHANGE INFORMATION
P/N: 21-1208
ISSUE NO: 3 4/00

This change contains information necessary to ensure the accuracy of the following manual:

Title:	**410 OPERATION AND MAINTENANCE MANUAL**
Print date:	**December 1983**
P/N:	**21-1030**
Revision:	**5**
Revision Date:	**8/94**

CHANGE #1

EFFECTIVITY: 21-1030 MANUAL REV. 5

On Page 5-3:

CHANGE: MAIN PCA PARTS LIST

CHANGE: The following information to the list.

REF DES	DESCRIPTION	HUNTRON P/N	CAGE MANUFACTURERS	PART NUMBER
1.A1.C3[4]	Cap, Tant 4.7uF, 25V	03-3088	31433	T350C475K025AS

CHANGE #2

EFFECTIVITY: 21-1030 MANUAL REV. 5

On Page 1-2:

CHANGE: Table 1-1. The "Alternation Rate" under **ELECTRICAL** should read "adjustable from 0.5Hz to 5Hz".

CHANGE #3

EFFECTIVITY: ALL UNITS STARTING WITH S/N 310-11847

On Page 5-3:

CHANGE: MAIN PCA PARTS LIST

CHANGE: The following information to the list.

REF DES	DESCRIPTION	HUNTRON P/N	CAGE MANUFACTURERS	PART NUMBER
1.A1.R3[9]	Res, MF 30.1KΩ 0.1% 1/4W	02-2365	09021	MF55E3012B

On Page 5-4:

CHANGE: MAIN PCA PARTS LIST

CHANGE: The following information to the list.

REF DES	DESCRIPTION	HUNTRON P/N	CAGE MANUFACTURERS	PART NUMBER
1.A1.U2[8]	IC, 74HC14 Tested	05-5181	57705	05-5181

CHANGE #3 (cont.)

On Page 5-5:

CHANGE: Notes to MAIN PCA PARTS LIST

CHANGE: The following note

[8]Serial numbers prior to S/N 310-20829 use IC, Schmitt Trigger Inverter, Huntron P/N 05-5018, CAGE 27014, Manufacturers P/N 74C14. Serial numbers from S/N 310-10829 to S/N 310-11846 use IC, Hex Schmitt Trigger, Huntron P/N 05-5062, CAGE 27014, Manufacturers P/N 74HC14.

ADD: The following note

[9]Serial numbers prior to S/N 310-11847 use Res, CF 47KΩ, 5%, 1/4 W, Huntron P/N 02-2143, CAGE 09021, Manufacturers P/N CF 1/4 47K J.

On Page 6-4:

CHANGE: FIGURE 6-2. MAIN PCA SCHEMATIC

CHANGE: The value of R3 (near U2A)

FROM: 47K

TO: 30.1K 0.1%

CHANGE #4

EFFECTIVITY: 21-1030 MANUAL REV. 5

On the title page's overleaf, change the CONTACTING HUNTRON information to:

"To obtain information about service, accessories and other products, contact:

Huntron, Inc.
15720 Mill Creek Blvd., Suite #100
Mill Creek, WA 98012
U.S.A.

In North America, call 800-426-9265 or 425-743-3171

Huntron is also accessible by:

- FAX: 425-743-1360
- Internet E-mail: huntron@huntron.com
- Internet Home Page: http://www.huntron.com

On page 4-1, Section 4-2, replace the second paragraph with:

"For in-warranty or out-of-warranty factory service in the United States, call (toll-free) 800-426-9265 to describe the malfunction and obtain an RMA Number and shipping instructions prior to shipment. This number must be clearly displayed on the exterior of the shipping carton. Only parcels displaying an RMA number will be accepted. Huntron is also accessible by FAX at 425-743-1360, by Internet E-mail at huntron@huntron.com, and on our Internet Home Page at http://www.huntron.com"

CHANGE #5

EFFECTIVITY: 10/94

On page 2-1 make the following changes:

Remove: 07-1229 qty 2
98-0032 qty 1
98-0033 qty 1

Add: 07-1234 qty 2
98-0214 qty 2
98-0215 qty 2

HUNTRON SWITCHER 410

OPERATION AND MAINTENANCE MANUAL

December 1983
P/N 21-1030
Rev. 5, 8/94

ABOUT THIS MANUAL

This instruction manual is divided into six sections and covers the general operation and maintenance of your instrument.

CONTACTING HUNTRON

For technical support or to obtain information about service, accessories, and other products contact:

Huntron, Inc.
15720 Mill Creek Blvd., Suite #100
Mill Creek, WA 98012
U.S.A.

In North America, call 800-426-9265 or 206-743-3171.

Huntron is also accessible by fax at 206-743-1360.

Outside North America, call your local distributor for assistance or service.

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SECTION 1
INTRODUCTION AND SPECIFICATIONS

1-1. INTRODUCTION

The Huntron Switcher 410, shown in Figure 1-1, has been designed as a compatible interface for the Huntron Tracker 1000 and Huntron Tracker 2000. Together, they create an effective test system for component troubleshooting. The Switcher 410 allows faster comparison testing of components by the use of ZIF (zero insertion force) sockets for out of circuit components and by the use of DIP clip cables for in-circuit ICs (Integrated Circuits).

Figure 1-1. Huntron Switcher 410 and Huntron Trackers.

1-2. SPECIFICATIONS

The specifications for the Switcher 410 are listed in Table 1-1.

Table 1-1. Switcher 410 Specifications.

ELECTRICAL

Alternation Rate ..... adjustable from 0.5 Hz to 10 Hz

Number of Test/Common Pins 40

Means of pin selection:

Test Pins ..... momentary pushbutton switches

Common Pins ..... jumper wires

Connectors:

(2) 40 Pin ZIF sockets (for 0.6" wide devices)

(2) 20 Pin ZIF sockets (for 0.3" wide devices)

Power Requirements:

Input Voltage ..... 8 VDC to 12 VDC

Input Current ..... 200 mA (max)

GENERAL

Size ..... 10"W x 2"H x 7.5"D
(25cm W x 5cm H x 19cm D)

Weight ..... 2lbs. 4oz. (1.0 kg)

Shock and Vibration ..... will withstand shock and vibration encountered in commercial shipping and handling.

ENVIRONMENTAL

Operating Temperature ..... 0°C to + 50°C (32°F to 122°F)

Storage Temperature ..... – 50°C to + 60°C (– 58°F to + 140°F)

Relative Humidity ..... 0 to 70% R.H.

1-3. SAFETY CONSIDERATIONS

This manual contains information, cautions, and warnings the user must follow to ensure safe operation, and to keep the instrument in safe condition.

WARNING

A warning denotes a hazard. It calls attention to a procedure or practice which, if not correctly performed or adhered to, could result in personal injury.

CAUTION

A caution also denotes a hazard. It calls attention to a procedure or practice which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the instrument.

1-4. LIST OF ACCESSORIES

The following accessories are available:

HUNTRON P/N	DESCRIPTION
98-0037	20 Pin DIP Clip Cables (1 pair)
98-0038	24 Pin DIP Clip Cables (1 pair)

To order any of the above items, or for further information, please contact Huntron.

NOTES:

SECTION 2
OPERATING INSTRUCTIONS

2-1. INTRODUCTION

This section describes the basic operation of the Switcher 410. Throughout the rest of this manual the Switcher 410 will be referred to simply as a "410". Take time to read this section carefully so that you can take full advantage of all the troubleshooting capabilities of the 410.

2-2. UNPACKING YOUR INSTRUMENT

Your instrument was shipped with the following items:

QTY	DESCRIPTION	HUNTRON P/N
1	Overlay, 6 & 8 Pin	01-2010
1	Overlay 14 & 16 Pin	01-2011
1	Overlay, 24 & 28 Pin	01-2012
2	16 Pin DIP Clip	07-1229
2	40 Pin DIP Clip	07-1230
1	Operation & Maintenance Manual	21-1030
1	Common Pin Jumper Set	98-0020
1	Power/Clock Cable	98-0031
1	16 Pin DIP Clip Cable	98-0032
1	40 Pin DIP Clip Cable	98-0033
1	Dual Banana Cable (red/black)	98-0035
1	10 kΩ Resistor Jumper Set	98-0085

Check the shipment carefully and contact the place of purchase if anything is missing or damaged in shipment. If reshipment is necessary, please use the original shipping carton and packing foam. If these are not available, be sure that adequate protection is provided to prevent damage during shipment. See section 4-2 for shipping information.

2-3. PHYSICAL FEATURES

Before you begin to use the 410, please take a few minutes to familiarize yourself with the instrument. All of the externally accessible features are shown in Figure 2-1 and summarized in Table 2-1.

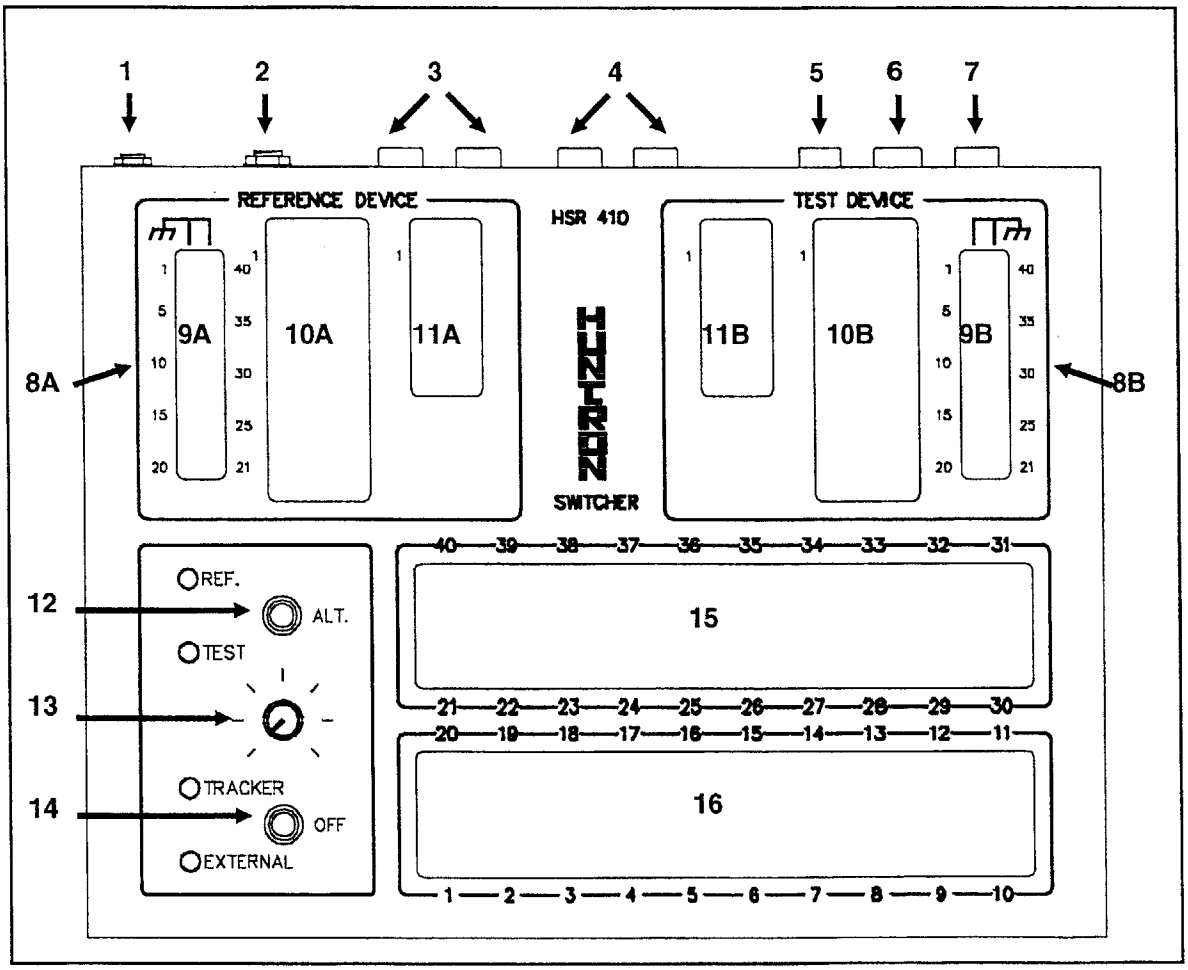

Figure 2-1. External Features

Table 2-1. Controls and Connectors.

Item No.	Name	Function
1	Ext CLK Jack	Provides connections for an external clock source from the Huntron Tracker 2000.
2	Power Jack	Provides connection for an external source of low voltage DC to power the 410.
3	TRACKER Jacks	Provides connection to a Huntron Tracker.
4	EXTERNAL Jacks	Provides connection to another test instrument (e.g. a digital multimeter).
5	Reference Device Probe Jack	Provides connection for Huntron Microprobe used to access reference device for pin by pin testing.
6	Common Probe Jack	Provides connection for test lead used to select Common Pins directly on test device and reference device.
7	Test Device Probe Jack	Provides connection for Huntron Microprobe used to access test device for pin by pin testing.
8A	Reference Device Section	Section containing features for connecting to the reference or "known-good" device.
8B	Test Device Section	Section containing features for connecting to the test device which is to be compared to the reference device.
9A	Reference Device Common Pin Jumper Socket	Socket used with a jumper wire to select the common pin on the reference device.
9B	Test Device Common Pin Jumper Socket	Socket used with a jumper wire to select the common pin on the test device.
10A	Reference Device 40 Pin ZIF Socket	Zero Insertion Force (ZIF) socket for cable connection to the reference device or for insertion of a reference device with up to 40 pins.
10B	Test Device 40 Pin ZIF Socket	ZIF Socket for cable connection to the test device or for insertion of a test device with up to 40 pins.
11A	Reference Device 20 Pin ZIF Socket	Same as 10A except for reference devices of 20 pins or less.
11B	Test Device 20 Pin ZIF Socket	Same as 10B except for test devices of 20 pins or less.
12	REF/ALT/TEST Select Switch	Toggle switch that is used to select the reference device, the test device, or to alternate between the two at a speed determined by the RATE control.
13	RATE Control	Controls the rate of device alternation.
14	TRACKER/OFF/EXTERNAL Select Switch	Toggle switch that turns 410 power off in the middle position and turns the 410 power on in the other two positions. The TRACKER position activates the TRACKER jacks (see item 3) and the EXTERNAL position activates the EXTERNAL jacks (see item 4).
15	Pins 21 - 40 Select Buttons	Momentary push buttons that connect the same pin (in the range from 21 to 40) on the reference device and the test device to the instrument connected to the 410 depending on the setting of the REF/ALT/TEST switch.
16	Pins 1 - 20 Select Buttons	Same as 15 except for pins in the range from 1 to 20.

2-4. SETUP AND OPERATION

The following procedure details how to setup and operate the 410 with a Tracker for in-circuit comparisons of a 14 pin ICs on different boards. Although other modes can be used with the 410, this procedure is the one most commonly used for troubleshooting.

1. Connect the power/clock cable supplied with your 410 to the accessory output on the back panel of the Tracker. Connect the other end of the power/clock cable to the 410 as follows:
   - If you are using a Tracker 2000, connect the two plugs to the power jack and the EXT CLK jack.
   - If you are using a Tracker 1000, connect the proper plug to the power jack and do not plug anything into the EXT CLK jack.
2. Connect the dual banana cable from the channel A jack and common jack on the Tracker to the TRACKER jacks on the 410. Keep the colors matched up i.e. red to red and black to black. Turn the Tracker power on. Select channel A on the Tracker.
3. Set the TRACKER/OFF/EXTERNAL switch to TRACKER. The Tracker LED should illuminate.
4. Set the REF/ALT/TEST switch to ALT (Alternate). This switch can be used to stop on either the reference device or the test device when a longer viewing time is needed. Adjust the RATE control to select a desired alternation rate. When using the Tracker 2000 use the RATE control on the 2000 (the RATE control on the 410 is disabled in this mode).
5. Place the 14 pin overlay over the top panel of the 410. Refer to the 14 pin graphics on the overlay when selecting pins.
6. Connect the two 16 pin DIP clip cables to the two 20 pin ZIF sockets on the 410. Be sure pin 1 is on top (red stripe on cable) and is aligned with pin 1 on the socket when a cable or device of less than 20 pins is used.

CAUTION

The devices to be tested must have all power turned off, and have all capacitors discharged before connecting the Tracker / 410 to the devices.

7. Connect the DIP clip end of the cable that is connected to the reference device section on the 410 to a 14 pin IC on a known-good board. The red stripe end of the clip is pin 1 so be sure that end of the clip is connected to pin 1 of the IC. Since this is a 16 pin clip the two pins on the opposite end of the clip will not be connected to anything.
8. Connect the DIP clip end of the test device cable to the 14 pin IC that is in the same location on the unknown board as the IC on the known-good board e.g. if you hooked up to U9 or IC9 on one board, hook up to U9 or IC9 on the other board.

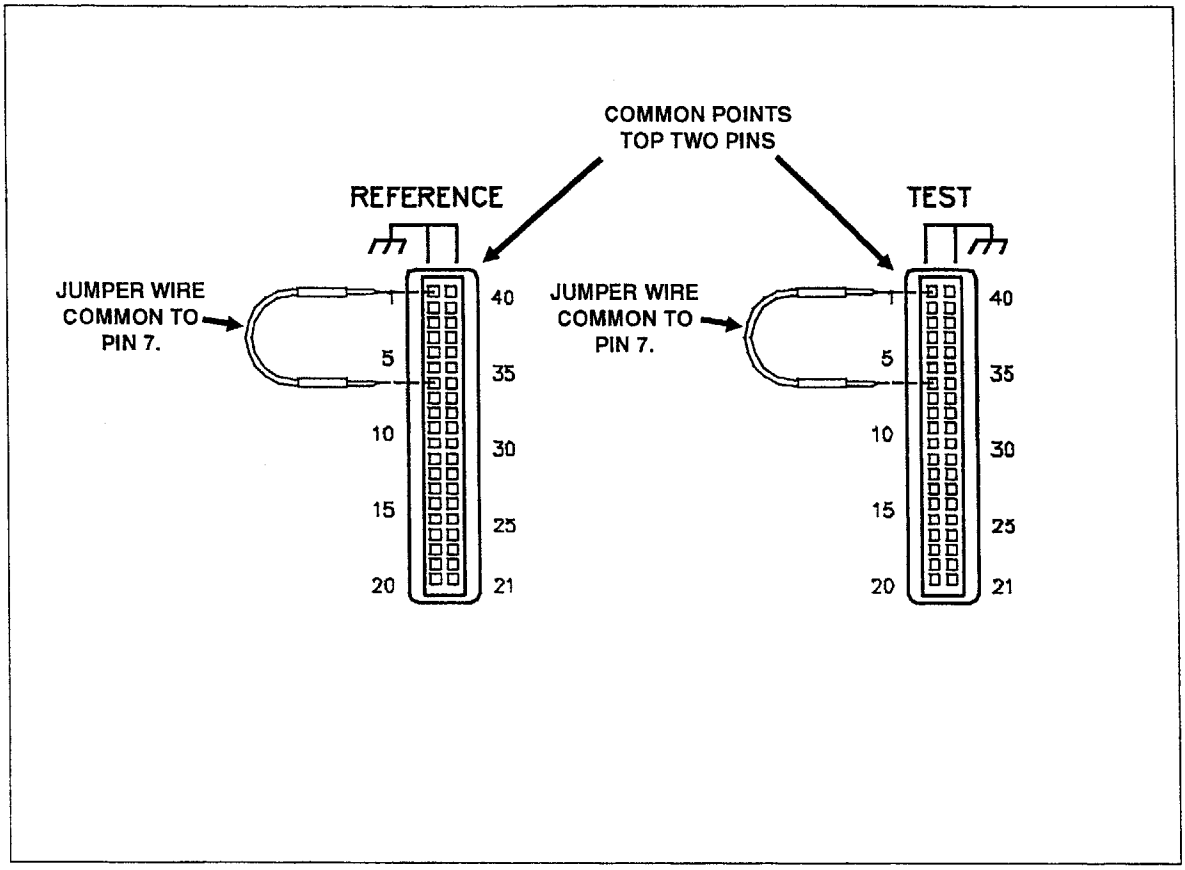

Figure 2-2. Common Pin Selection.

9. Usually on 14 pin ICs, pin 7 is ground and that is a good selection for the common pin. The common pin is that pin which the test is made "with respect to". In other words, if pin 7 is common and you test pin 1 of an IC you will see the analog signature of pin 1 with respect to pin 7. Like any other two terminal test instrument you must make two connections to the device under test. To select pin 7 as the common pin on the 410, use the Common Pin jumper wires and the Common Pin Jumper Sockets (see Figure 2-2). Connect the jumper wires between pin 7 and the top pins labeled on each of the two sockets. All points marked on the 410 are the common points (NOTE: is not earth ground).

10. Next, press the pin 7 button on the 410. The Tracker should display a vertical line which is the signature of a short circuit. This does not test the devices on the board but it does make sure that the 410 is set up correctly. You are now ready to begin comparing the signatures between the two boards.

11. Pressing the buttons for pins 1 to 7 in the lowest row of the 410 and pins 8 to 14 in the next row up will produce alternating displays of each pin on the Tracker CRT. Be sure to select an appropriate impedance range on the Tracker for the type of device being examined (consult your Tracker manual for more information on range selection).