

IGT'S GUIDE FOR IDX COIN ACCEPTORS BY TOM MOLLITT

IGT is replacing coin acceptors in machines configured to \$1.00 and higher denominations. IGT machines previously equipped with the coin mechanism® models CC32 and CC33 will now be available with the IDX X-10 acceptor. Those machines normally using models CC36 or CC37 will now be available with the IDX X-50 acceptor. These coin acceptors offer the highest level of anti-counterfeiting security while providing superior acceptance and reliability.

The Features

The coin mechanism's comparator® utilizes an electromagnetic sensing coil to compare the metal properties of a sample coin to the coin inserted by the player. The IDX acceptor also evaluates the metal properties of the inserted coin, but the comparison is made to memory, the metal properties of the coin is read by 3 difference sensor at 3 difference location on each coin. The IDX acceptor **does not** require a sample coin. The acceptor "learns" the 5 properties of the coin it is set up to accept. The technology behind this is sophisticated but the operation is simple and reliable. With the Coin Mech comparator, only the portion of the coin that passes through the sensor assembly is analyzed. In the IDX acceptor, the coin or token metal is analyzed in three places, the leading edge, center, and the trailing edge of the coin. This method dramatically reduces slugging and offers increased reliability when using bimetallic tokens. Optical sensors are also used to precisely measure the diameter of the coin and the acceptor will reject coins that are off by as little as 15/1000 of an inch. This feature eliminates the "shaved coins" that are commonly used to cheat the coin-out optics in hoppers.

Additionally security is added when the unit is programmed to accept only X-Mark®

IGT'S GUIDE FOR IDX COIN ACCEPTORS BY TOM MOLLITT

Tokens. Facets cut into these tokens reflect light from optical sensors at a precise angle. When the X-Mark® tokens are used, the acceptor will now use five parameters to validate or reject the inserted coin. Cross-play of tokens from neighboring casinos can be virtually eliminated, if desired or can choose the tokens you want to accept.

◆ The X-Mark token is not required to operate an IDX acceptor. Use of this type of token will dramatically increase the anti-counterfeiting security capabilities of the unit.

IDX acceptors also include self-test diagnostics and a RS232 serial data port, which can be used to connect the unit to a PC for diagnostic purposes. Simply connect to Hyper-Terminal used in windows software.

X-MARK TOKENS

Incorporated into every IDX acceptor are two Optical Sensor assemblies that are used to “read” the facets cut into the X-Mark token. These tokens have a ring of angled cuts on both surfaces that will reflect light back into sensor assemblies. The acceptor is manufactured to read reflected light from only those tokens that are cut with the correct angle. The acceptor will read reflected light from both sides of the X-Mark token, even if the facet angles are different for each side.

LEARNING

Each IDX acceptor must be programmed for the coin(s) it is intended to accept. Both the X-10 and X-50 models have 6 memory locations, which can each be programmed with the 5 properties of a different coin.

IDX Coin Learn Procedure

1. Slide the front cover up to identify the three controls to be used in this procedure:
 - a. The "TEST" push button near center bottom.(used to input the number of credit pulses. (IGT = 1))
 - b. 16 position rotary switch to the right of the push button. (#0 is normal run position, #1-#6 are for learning each of 6 possible coin types that can be accepted.)
 - c. LED indicator half way up on the right side. (green in RUN mode, red in LEARN mode)
2. Turn the rotary switch to one of the LEARN positions #1 - #6 and observe the LED turns RED to indicate it ready to learn.
3. Push the test button once for each gate pulse, (sent to IGT coin optics board- purple wire) you wish to have issued for this coin. (IGT = ONE)
4. Slide the cover back on the unit to make sure outside light does not interfere with the sensors.
5. Show the unit 6 samples of the coin by depositing them into the acceptor as usual. It is best to use 6 different coins since there are typically slight variations from coin-to-coin.
6. After the 6th sample coin is deposited, the LED will flash red/green a few times to indicate the LEARN procedure is complete and the coin parameters are stored in memory.

**IGT'S GUIDE FOR IDX COIN ACCEPTORS
BY TOM MOLLITT**

7. Slide the front cover open again and turn the rotary switch back to position # 0 and observe the LED turning green. Check that you have not accidentally turned it too far to position # 15, which is a field test function position, in which it will not accept coins.
8. Slide the front cover back down and you should now be able to accept the new coin.

◆ Important! The rotary switch must be returned to position “0” for normal operation.

The IDX Xeptors only accept coin if the 5 parameters are matched to memory, but will Reject good and bad coins if the setting on the Xeptor **are not set correctly** based on thickness and diameter of the coin or token. Remember the coin is only a piece of metal, if it doesn't have a code embedded in it. The coin cannot be identified if the throat is too large or the coin will become stuck if the throat is too small.

The acceptors must be set occurring to the Coin Thickness and Diameter Set up sheet or they will reject almost everything. These setting have to be correct or the acceptor will reject some of the good coins.

SEE PAGES 5, 6, AND 7.



Model X-50 X-Mark® Xeptor® Diameter & Thickness Setup

Rev. 3/98

INTRODUCTION

In order for the X-50 Xeptor® to maintain high performance and accommodate the wide range of coin diameters and thickness in the market, it has been designed to incorporate a means for field adjusting the coin chute width and thickness to optimize performance for your particular coin.

In order to properly read the X-Mark® optical code or to properly measure the inductive signature of the center of a coin, it is imperative that the coin be reasonably centered in the coin chute so that optical code facets are oriented correctly and repeatable for the optical code sensors and so that the center of the coin passes repeatable over on the inductive sensors. The X-50 Xeptor® has field adjustable coin chute width to accurately guide the coin through the acceptor.

Furthermore, to get a good repeatable read of the optical code and the most discriminating inductive signature measurement, it is imperative that the sensors on each side of the coin chute be as close as possible to the coin. A thin coin in a wide chute produces weaker signals with more variation. The X-50 Xeptor® has a built in adjustment to control coin chute thickness.

THICKNESS SETUP

Figure 1 of the X-50 Xeptor® is a side view showing a series of three holes and a sliding adjustment with a detent that centers itself over one of the selected holes. The dimensions referring to each of the eight holes is the chute thickness achieved at each position of the sliding adjustment. A good rule of thumb would be to set the adjustment for about 0.010" more than the thickest coin in the intended coin set.

**IGT'S GUIDE FOR IDX COIN ACCEPTORS
BY TOM MOLLITT**

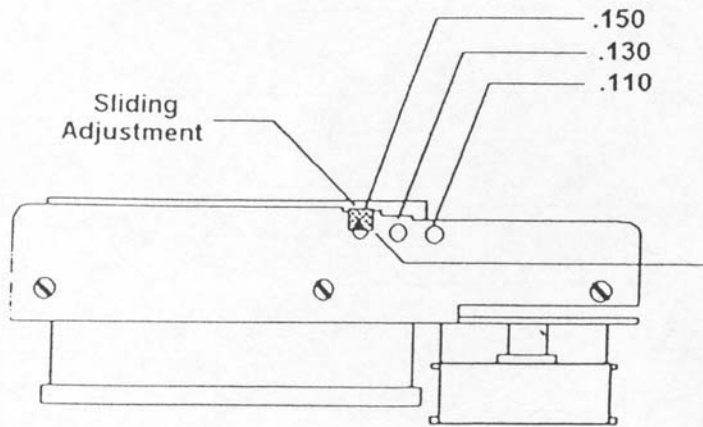


Figure 1. Coin chute thickness adjustment.

TYPICAL CASINO TOKENS

VALUE	THICK	SET TO
\$1 Token	.100	.110
\$2 Token	.100	.110
\$5 Token	.122	.130
\$10 Token	.136	.150
\$25 Token	.100	.110
\$50 Token	.115	.130
\$100 Token	.080	.110
\$500 Token	.089	.110

DIAMETER SETUP

The X-50 Xeptor® has field adjustable sliding coin chute width guides with three primary positions; two of which are shown in figures 2 and 3. To move the coin chute width guides, loosen the fastening nuts with a ¼" nut driver, slide them to the desired position, then tighten the nuts. Choose the width for compatibility with the intended coin set as specified in the tables below. Note that there are three scallop like indents for the mounting studs to align with on each of the mounting tabs of the chute width guides. Testing a sample coin in the unit prior to installation is recommended to ensure proper sizing.

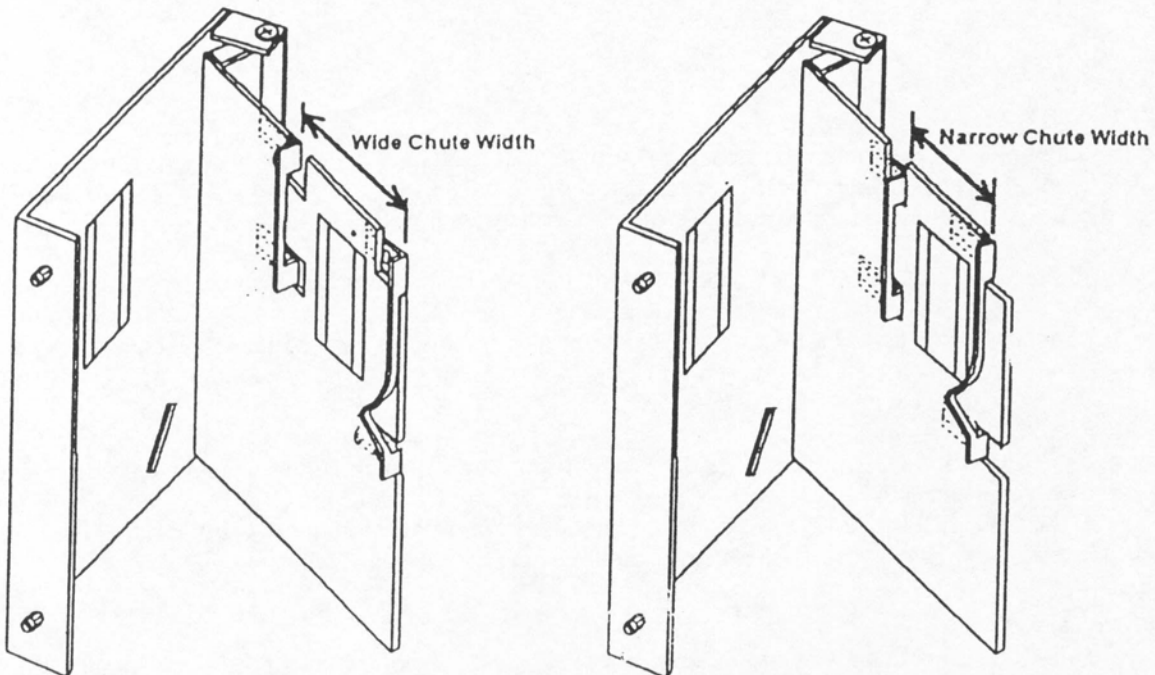


Figure 2. Opened X-50 Xeptors showing wide and narrow chute adjustments.

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TYPICAL CASINO TOKENS

VALUE	DIAMETER	SET TO
\$1 Token	1.465	Narrow
\$2 Token	1.340	Narrow
\$5 Token	1.755	Wide
\$10 Token	1.700	Medium or Wide
\$25 Token	1.65/1.875	Medium/Wide
\$50 Token	1.800	Wide
\$100 Token	1.600	Medium
\$500 Token	1.550	Narrow or Medium

EDGE GUIDE POSITION	COIN CHUTE WIDTH	MAX. COIN DIAMETER	MIN. COIN DIAMETER
Narrow	1.575	1.550	1.340
Medium	1.725	1.700	1.550
Wide	1.900	1.875	1.700

**IGT'S GUIDE FOR IDX COIN ACCEPTORS
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X-10 XEPTOR® COIN THICKNESS AND DIAMETER SETUP

Rev. 06/12/01 All the numbers listed below are the maximum tolerance allowed. Remember tighter is always better.

- Select the proper diameter spacers for your coin size from tables below.
- Apply two spots of adhesive as shown above left to aid retention.
- Snap in the diameter spacers as shown above right.
- Wipe clean any excess adhesive interfering with coin path.

Generally, select a position for the sliding adjustment that gives at least 0.010" extra coin chute thickness, but not more than 0.020" extra.

- H position or #7 setting = .130"
- G position or #6 setting = .123"
- F position or #3 setting = .116"
- E position or #2 setting = .110"
- D position or #5 setting = .103"
- C position or #1 setting = .097"
- B position or #4 set = .092"
- A position or #0 set = .087"

Sliding Adjustment

- Select the proper thickness for your coin size from tables below.
- Move the sliding adjustment to adjust the coin chute thickness.
- A bent tip needle nose pliers may be helpful in the adjustment.

Spacer Use & Identification

Spacer Dash No	Max. Coin Diameter	Spacer Width
--	1.475	--
-1	1.355	0.062
-2	1.255	0.112
-3	1.130	0.175
-7	1.110	0.190
-4	1.003	0.240
-5	0.915	0.280
-6	0.875	0.300

Choose a spacer having a Max Coin Diameter slightly larger than the coin to be accepted. Poor control of coin position

Best Spacer And Thickness Choices For North American Currencies And Typical Casino Tokens

Currency	Diam x Edge	Spacer	Thick
US \$.05	0.835 x 0.078	6 (5, 4)	B or #4
US \$.10	0.705 x 0.053	6 (5)	A or #0
US \$.25	0.955 x 0.067	4 (3, 7)	A or #0
US \$.50	1.205 x 0.083	2 (1, 0)	C or #1
US \$1.00	1.043 x 0.079	7 (3, 2)	C or #1
Can \$.05	0.835 x 0.069	6 (5, 4)	A or #0
Can \$.10	0.710 x 0.048	6 (5)	A or #0
Can \$.25	0.938 x 0.062	4 (3, 7)	A or #0
Can \$.50	1.068 x 0.075	2 (1, 0)	B or #4
Can \$1.00	1.043 x 0.077	3 (3, 2)	C or #1
Can \$2.00	1.102 x 0.071	3 (2, 1)	A or #0

X-Token	Diam x Edge	Spacer-A	Spacer-B	Thick
US \$.05	0.800 x 0.067	6 (5)	6	A or #0
US \$.10	0.875 x 0.067	5 (4)	5	A or #0
US \$.25	0.984 x 0.067	4 (7, 3)	4	A or #0
US \$0.50	1.240 x 0.080	2 (1)	2 (1)	C or #4
US \$1.00	1.465 x 0.100	--	--	F or #3
US \$2.00	1.340 x 0.100	1 (--)	1 (--)	F or #3
Ont. \$.05	0.800 x 0.067	6 (5)	6	A or #0
Ont. \$.25	0.900 x 0.067	5 (4)	5	A or #0
Ont. \$.50	1.073 x 0.067	7 (3)	7 (3)	A or #0
Ont. \$1.00	1.125 x 0.100	3 (2)	3 (2)	F or #3
Ont. \$2.00	1.240 x 0.100	2 (1)	2 (1)	F or #3
Ont. \$5.00	1.465 x 0.100	--	--	F or #3

Note: Casino token dimensions are examples of the most common in the USA and Ontario Canada (but not all gaming jurisdictions). Spacer values in parentheses indicate less than optimal selections, but which may still have an acceptably small percentage rejection. "Spacer-A" and "Spacer-B" columns are for tokens with X-Mark code locations the A (peripheral) or B (inset) bands respectively.

Coin De-Learn Procedure

DE-Learning or erasing memory

IDX acceptors can also erase memory not to accept a previous learned coin.

1. Slide the front cover up and turn the rotary switch to the coin # position you wish to de-learn.
2. Push the test button once to initiate the LEARN sequence.
3. Turn the rotary switch back to position # 0 without depositing any coins to signal the unit that you wish to erase the parameters for this coin. The LED will flash red/green to indicate completion.
4. The parameters are erased when the rotary switch leaves the switch position where the test button is pushed but no coins are deposited.
5. Slide the front cover back down.

To clear a memory location within the IDX unit:

1. Select memory location with rotary switch.
2. Press SW 1.
3. Return rotary switch to position "0" or next position, memory will erase when rotary switch leaves the position where the test button is pushed.

UN-Wanted COINS

To program the IDX acceptor **NOT** to accept a certain coin:

1. Turn rotary switch to position "1"
2. Press SW 1, 13 times
3. Insert 6 of the undesired coins into the acceptor or one coin 6 times
4. Return rotary switch to position "0".

IGT'S GUIDE FOR IDX COIN ACCEPTORS BY TOM MOLLITT

5. Desired coins can be programmed in any of the remaining memory locations position 2 through 6.

INSTALLATION

The IDX acceptors are designed to be a direct replacement for the Coin Mechanism Comparitor. The IDX unit will snap into the existing coin chassis. IDX provides a "Personality Plug" for each acceptor. These are designed to mate with the existing cabinet wiring without requiring any further modification. IDX units are designed to work with a variety of coin and token sizes. The X-10 model can be used with coins up to 1.47" in diameter and .122" thick. The X-50 is used for coins with a diameter between 1.340" and 1.875" and a thickness up to .150". All IDX units are equipped with a sliding adjustment bracket that is used to specify coin thickness. For the X-10 model, coin diameter will be specified with snap in spacers. The X-50 model incorporates adjustable width guides that are used to set the coin diameter.

If the X-10 is installed as a replacement for a CC32 or CC33, it will be necessary to change the coin head and coin base and the location of the coin chassis within the cabinet. Traditionally, the CC32 and CC33 comparators have been installed "backwards". The front of the unit faced into the main door of the machine. This was due to the manner in which an accepted coin exited the comparitor. The accepted coin comes out the opposite side of the comparitor from where it was inserted. The X-10 does not work in this fashion.

The X-50 is a two-piece model consisting of a Part A and Part B. The CPU for this acceptor is separate from the main unit. When installed into an IGT machine, the CPU assembly is usually mounted with Velcro, on the main door panel assembly. The acceptor portion of the X-50 is installed in the same manner as a CC36 or CC37,

**IGT'S GUIDE FOR IDX COIN ACCEPTORS
BY TOM MOLLITT**

“backward” or facing into the machine door. When X-50 leave factory Part A and Part B are calibrated together. If either parts are changed then they must be calibrated (see SW2 switch position #9 and #A) and coins re-learned after calibration.

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BY TOM MOLLITT**

FIELD TESTS AND DIAGNOSTICS

On power up reset, the Model X-10 Xeptor performs a series of self-tests when rotary switch SW2 is in position 0. If it passes all tests, the indicator LED turns green and normal operation commences. If any of the self-tests fails, the indicator LED flashes red/green twice a second and no coins will be accepted. The model X-10 xeptor was designed with built in field test and diagnostic capability to aid in troubleshooting problems away from the test bench. Specific field test functions are invoked by accessing rotary switch SW2 (used for programming) in the lower right corner of the circuit board and selecting positions 7,8,9,A, B, C, D, or F. In order to return the Xeptor to normal operation, it is imperative that the SW2 be returned to position 0.

The following table and descriptions on the next page illustrate the diagnostic functions associated with each switch setting and the corresponding LED condition. Included are expected oscilloscope waveforms in the event of a test bench environment. . Additional diagnostic functions are available through the RS232 serial interface.

**IGT'S GUIDE FOR IDX COIN ACCEPTORS
BY TOM MOLLITT**

IDX Diagnostic Functions

Rotary Switch	Function	Action	Result
0	Gate Relay Test	Press SW 1	Activates Gate Relay
7*	Memory Test	Observe LED Color	Green LED = Pass Red LED = Fail
8**	Credit Sensor Test	Observe LED Color	Yellow LED = not installed Green LED = Pass Orange/Red LED = dirty/blocked
9	Optic Sensor Calibration (Front side optics) In X-50 two piece units Has a part A&B= both Must be calibrated & Re-learned if either A or B is changed	Install small piece of white paper, folded twice, into center of coin chute and press SW1	Orange LED = Unit has successfully adjusted the optical sensor sensitivity.
A	Optic Sensor Calibration (Rear side optics) Same as #9	Follow procedures for front side optics	Same as front side optics
B	Diameter Optics Sensor	Observe LED	Green LED = Pass RED/Orange LED = dirty/blocked
C	Diameter Optics Sensor	Observe LED	Green LED = Pass RED/Orange LED = dirty/blocked
D	Diameter Optics Sensor	Observe LED	Green LED = Pass RED/Orange LED = dirty/blocked
E	Inductive Metal Sensor	Observe LED	Green LED = Pass Red LED = Fail
F	Inductive Metal Sensor	Observe LED	Green LED = Pass Red LED = Fail

- Test #7 performs a checksum of the X-10 memory, both the program ROM and the non-volatile operating parameter EEPROM. The LED will be green if the test is passed and will flash red/green twice a second if the test fails. Unless one of the chips has physically failed, the failure may likely have been caused by power interruption in the middle of writing parameters to the

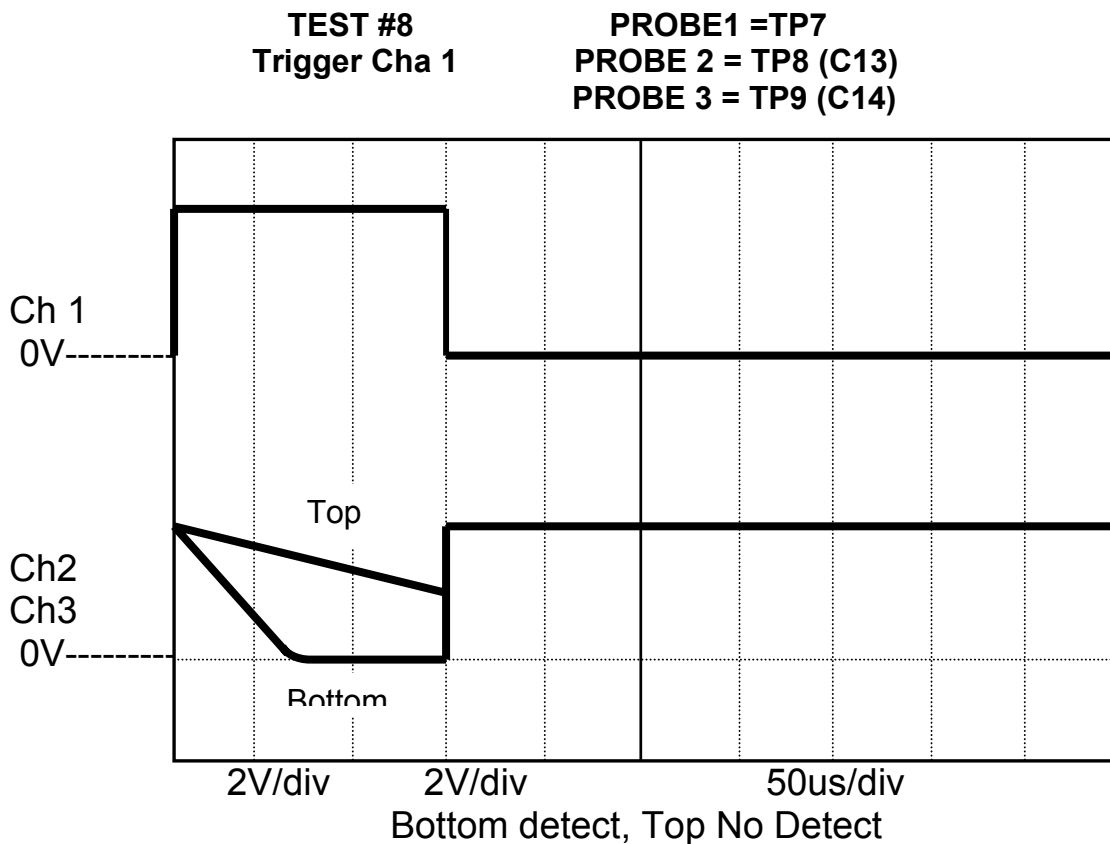
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EEPROM after a learn cycle or a download of parameters over the serial communication port. To clear this problem simply repeat the parameter

download procedure or press the button adjacent to the rotary switch to repair the checksum and re-learn any coin types not being correctly accepted.

** Test #8 performs a check on the coin passage reflective sensors just above and below the gate relay rake which verify actual coin passage in the proper direction.

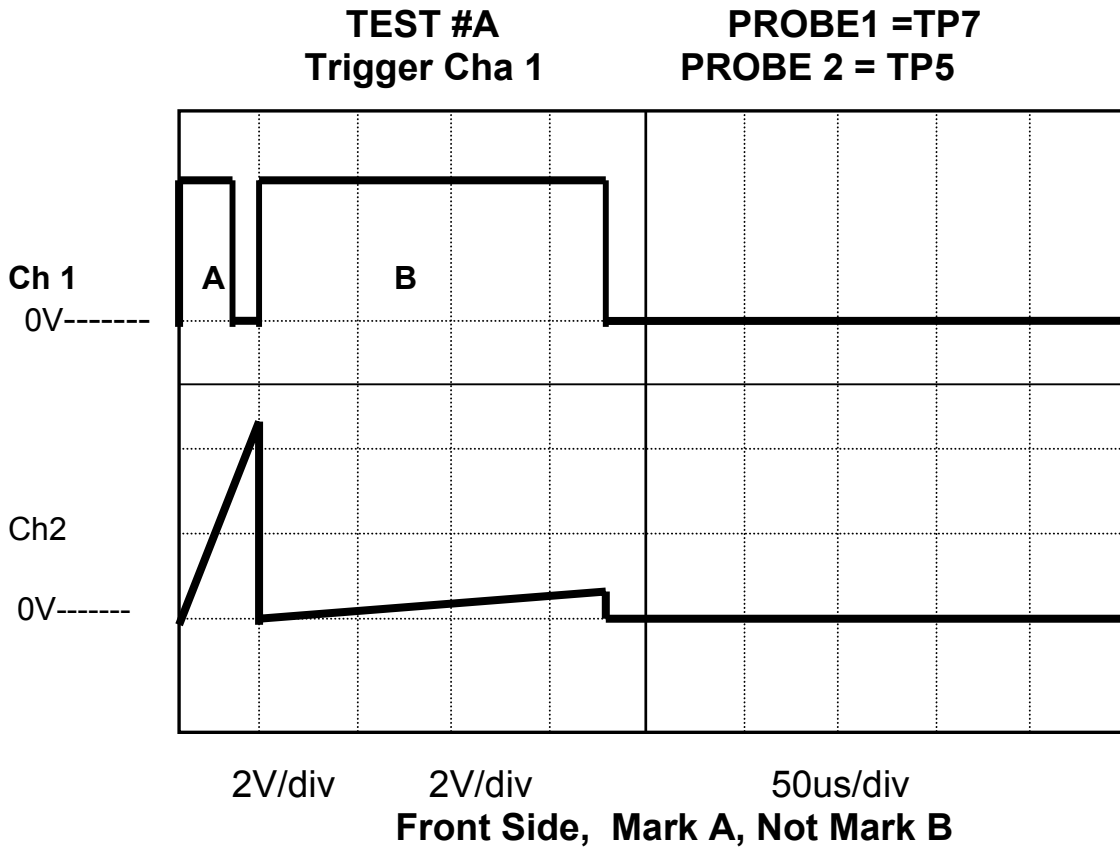
When operating properly, the LED will be green when there is no token presented to either sensor, and red when a token is presented to either of the sensors. Testing should include presenting a token to the top and bottom sensors individually to confirm them individually.



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BY TOM MOLLITT**

Test # 9, and # A: X-Mark Optics Test

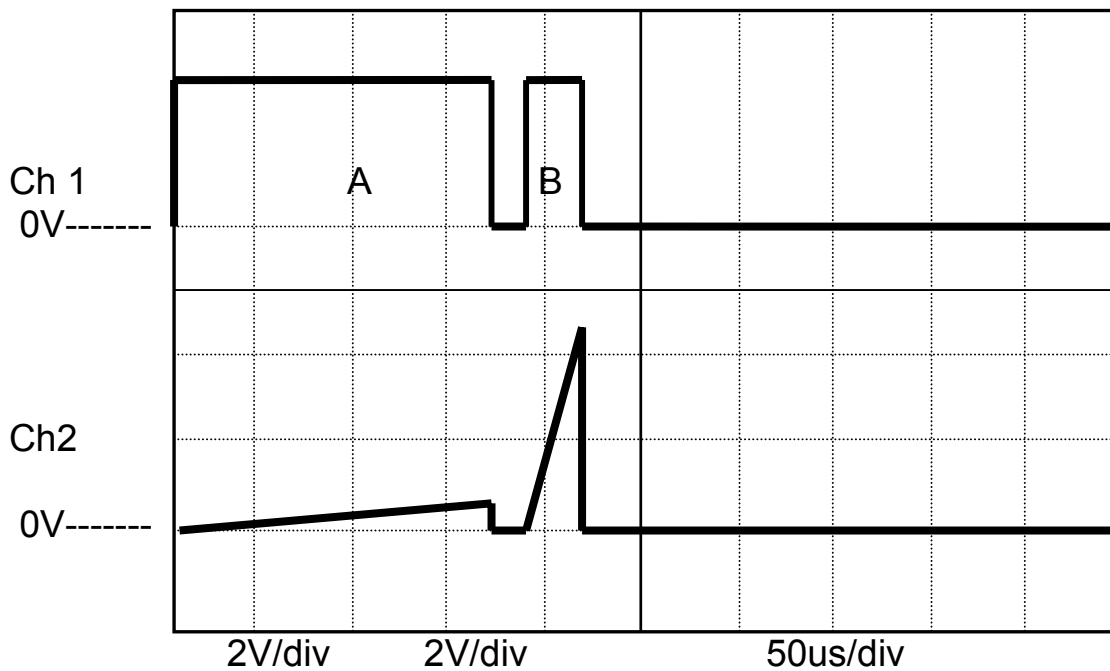
Tests #9, and #A perform a check on the ability of the X-10 to correctly read an X-Mark on a token. Test #9 checks the X-Mark reading optics on the back side while test #A test the X-Mark reading optics on the front side. When operating properly, the LED will be green when there is no X-Mark detected and red when a X-Mark is present and detected. There are two X-Mark detectors on each side of the coin chute and detection by either one of them will cause the LED to turn red.



IGT'S GUIDE FOR IDX COIN ACCEPTORS
BY TOM MOLLITT

TEST #9
Trigger Cha 1

PROBE1 =R18
PROBE 2 = TP6



Back Side, Mark B, Not Mark A

TESTS #B, #C, AND #D; DIAMETER OPTICS TEST

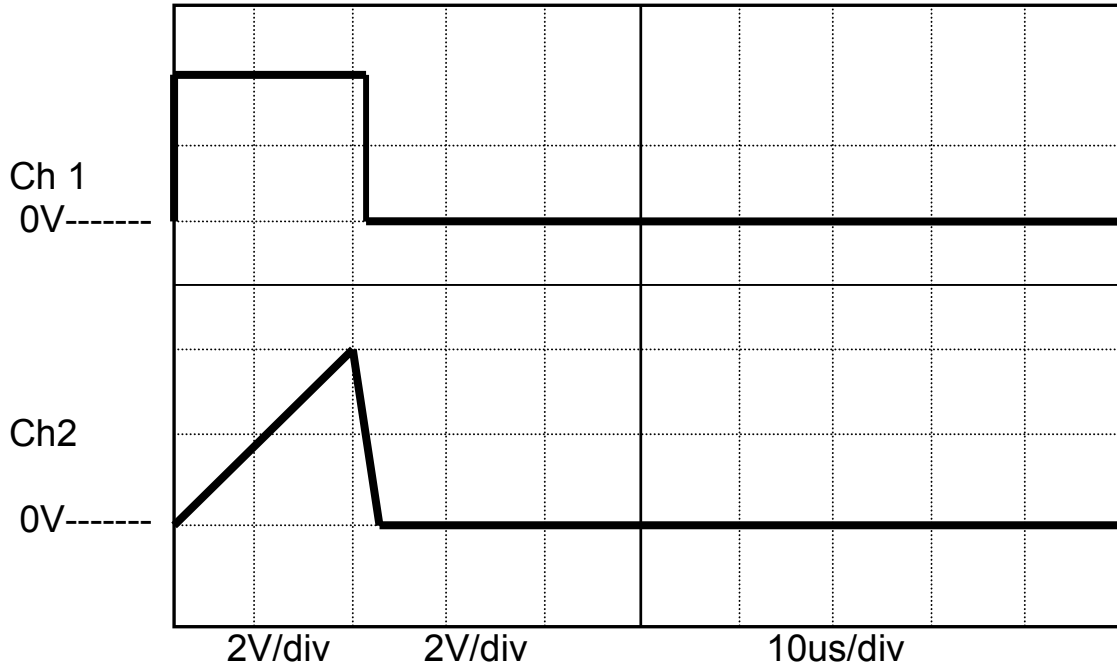
Tests #B, #C, and #D perform beam strength tests on the three optical thru-beam sensors used to measure coin diameter. Test #B checks the bottom (B-bottom) beams, about 1.6" from the coin chute top. Test # C checks the middle (C-center) beams, about 1.3" from the coin chute top. Test # D checks the top beam (D-drop) about 0.4" from the coin chute top. When operating properly, the LED will be green when the beams are not blocked and red when they are blocked or otherwise non-functional.

For Drawing SEE NEXT PAGE

IGT'S GUIDE FOR IDX COIN ACCEPTORS
BY TOM MOLLITT

TEST #B,C,D
Trigger Cha 1

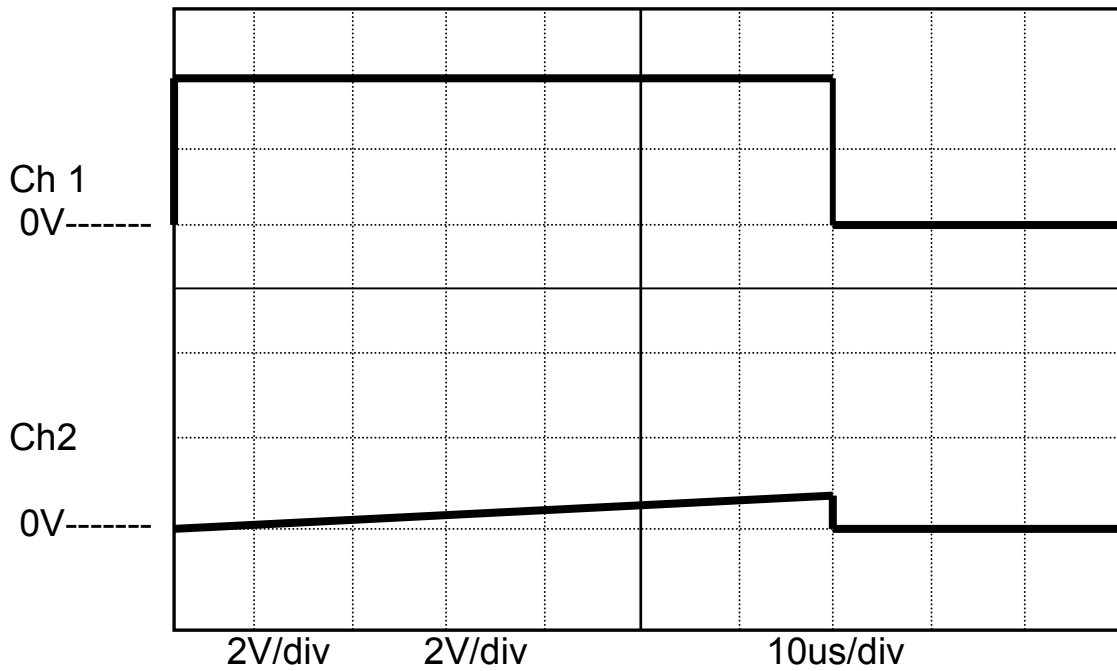
PROBE1 = TP7
PROBE 2 = TP5



Typical for LED = Green

TEST #B,C,D
Trigger Cha 1

PROBE 1 = TP7
PROBE 2 = TP5

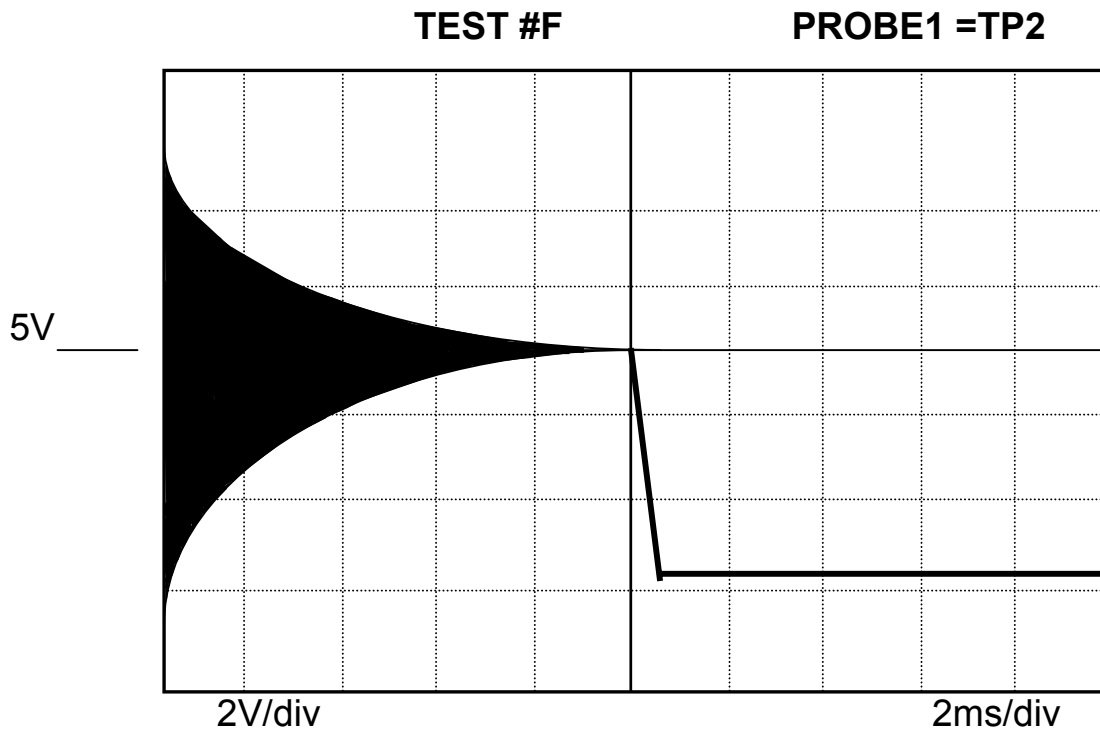


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BY TOM MOLLITT**

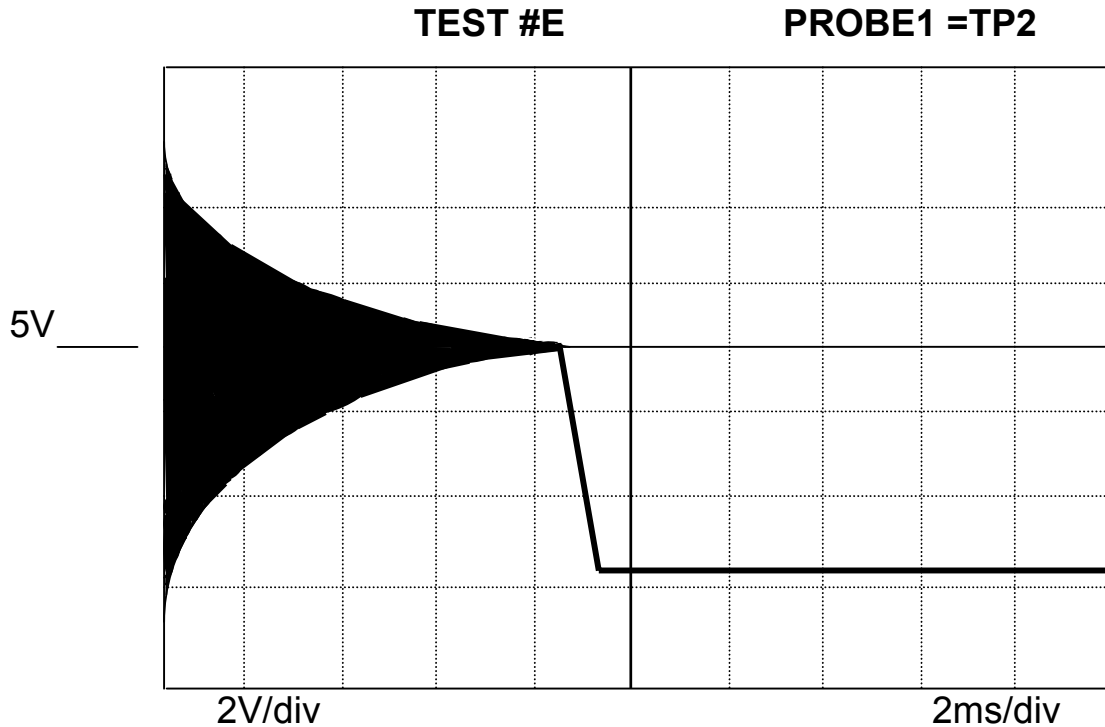
Typical for LED = Red

TESTS # E and # F: INDUCTIVE COIL TEST

Tests #E and #F perform a check on the inductive coils operated in both series aiding and series opposing modes. When operating properly, the LED will be green with no coin between the sensing coils, and red with an inductively lousy coin between the sensor coils. If no coin is present and the flat cable to the rear box is disconnected or the circuit is otherwise non-functional, the LED may flash red/green twice per second or turn red



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ADDITIONAL IDX PRODUCTS

X-KEY

The X-key provides a means of controlling access to the programming features of the IDX acceptors. The “learning” capabilities of the acceptor can be enabled/disabled with the X-Key. This can prevent unauthorized programming of the unit. Once an acceptor has been secured with the X-Key, it cannot be reprogrammed again without it.

X-Tracker

X-Key management software. This is a windows® based utility program that is used to enable/disable the X-Key. It also allows the user to download information from the X-

**IGT'S GUIDE FOR IDX COIN ACCEPTORS
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Key. Each time the X-Key is used, it will record the electronic serial number of each acceptor it is connected to. The X-Tracker software can be used to retrieve this information as well as to log in/out X-Key users.

IGT'S GUIDE FOR IDX COIN ACCEPTORS BY TOM MOLLITT

DD-1050

Token diverter driver. This accessory can be added to an IGT machine and used to drive the coin diverter. The IDX unit can be programmed to accept up to 6 different coins. The DD-1050 will divert certain coins directly to the drop, regardless of the current hopper level. For example; a casino offers a non-redeemable promotional token to their guests. This token could be accepted in a dollar machine and diverted to the drop with the DD-1050, the same machine could accept the normal dollar token and it would be directed to either the hopper or drop, depending on the current hopper level.

X-Terminator

This accessory will alert floor personnel to attempts at cheating the acceptor, i.e. stringing and slugging. A tilt output is sent to an LED panel placed in the top section of the machine's service light. This can also be used to detect coin jams in the acceptor.