TECHNICAL MANUAL

**ORGANIZATIONAL MAINTENANCE MANUAL
ELECTRONIC CIRCUIT PLUG-IN
UNIT TEST SET TS-3317 EQUIPMENT MAINTENANCE**

**EXPANDED TROUBLESHOOTING
(LOGIC DIAGRAM THEORY)**

**GUIDED MISSILE AIR DEFENSE SYSTEM
AN/TSQ-73**

This copy is a reprint which includes current pages from Change 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

19 OCTOBER 1982

WARNING

DANGEROUS VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching It.

Be careful not to contact high-voltage connections when Installing or operating this equipment,

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

WARNING

Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

EXTREMELY DANGEROUS POTENTIALS

greater than 500 volts exist in the following units:

Display console high voltage power supply

Display console CRT

WARNING

For emergencies requiring immediate shutdown of system power, press SYSTEM POWER OFF switch located on power cabinet power transfer unit. Observe that SYSTEM POWER ON indicator light goes off.

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Change }

No. 2

Organizational Maintenance Manual: Electronic Circuit Plug-In Unit Test Set TS-3317

Expanded Troubleshooting (Logic Diagram Theory)

GUIDED MISSILE AIR DEFENSE SYSTEM AN/TSQ-73

Current to Tape Version 34

TM 9-1430-655-20-9-2, 19 October 1982, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by the applicable change number, i.e., Change 2, at the bottom of the page adjacent to the page number. Revised text will have a vertical bar in the margin next to the changed area. Revised illustrations will have suffix change letter added to the identification number.

Remove Pages	*Insert Pages*
A/(B blank)	A/(B blank)
i and ii	i and ii
7-3 thru 7-8	7-3 thru 7-8
7-11 thru 7-14	7-11 thru 7-14

2. File this change sheet in front of the publication for reference.

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7-145	1	7-189	0	7-231 - 7-237	0
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7-147	1	7-191	0	7-239	0
7-148 Blank	1	7-192 Blank	0	7-240 Blank	0
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TECHNICAL MANUAL

No. 9-1430-655-20-9-2 }

Organizational Maintenance Manual: Electronic Circuit Plug-In Unit Test Set TS-3317

Expanded Troubleshooting (Logic Diagram Theory)

GUIDED MISSILE AIR DEFENSE SYSTEM AN/TSQ-73

Current to Tape Version 34

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS
You can help improve this publication. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, U.S. Army Missile Command, ATTN: AMSMI-LC-ME-P, Redstone Arsenal, AL 35898-5238. A reply will be furnished to you.

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CHAPTER 7
MODULE TEST SET EXPANDED TROUBLESHOOTING

SECTION I. INTRODUCTION

7-1. Scope. The expanded troubleshooting part of TM 9-1430-655-20-9 of the Module Test Set (MTS) Equipment Maintenance for Guided Missile Air Defense System AN/TSQ-73 is contained in volumes two and three. It provides supplemental information for the use and guidance of advanced personnel responsible for repair of the MTS beyond the scope of organizational maintenance covered in the basic TM 9-1430-655-20 series of technical manuals.

7-2. Expanded Troubleshooting Concept. Expanded troubleshooting is required when existing fault isolation procedures in the basic manuals fail to isolate and correct a malfunction. The troubleshooting covered in this manual is based on the use of existing onsite equipment (tapes, tools, test equipment, spare parts, and publications). Isolation of malfunctions is based on the fault analysis of normal system operating conditions and the use of built-in maintenance and diagnostic (M&D) software programs.

7-3. Troubleshooting Aids. Volume two contains the detailed descriptions and the related functional block diagrams. The functional block diagrams are related to the functional logic diagrams in volume three by the titles of the functional areas. Power distribution diagrams cabling diagrams, and front-panel schematic diagrams are also supplied in volume three.

   a. Input/Output Tables. Input and output tables are provided, as applicable, for each figure and sheet to enable easy access to signals referenced to other diagrams.

   b. Input/Output Symbols. Symbols used on diagrams to indicate input and output signals include the following:

   ▲ Indicates input from another figure.
   Δ Indicates input from the same figure.
   ■ Indicates output to another figure.
   □ Indicates output to the same figure.
   ◪ Indicates output to the same and another figure.

   c. Equipment Interface. The troubleshooting diagrams may reference inputs and outputs interfacing between other pieces of equipment. When a notation shows that external equipment is involved, it is assumed that the user will refer to the applicable troubleshooting information provided for that equipment.

   d. Logic Symbols. Logic symbols depend on card types. For discrete circuit cards containing conventional integrated circuits, conventional logic symbols are used. These symbols are used independently, with card locations and card pin numbers notated with the symbol. For analog circuits, circuit card details are provided only to a functional level.

7-4. Physical Description. The MTS (fig. 7-1) is a portable case-mounted assembly normally mounted in the maintenance bench. Accessories and adapters supplied with the MTS are stored in the maintenance bench and are shown in figure 7-2. The MTS includes two digital card racks, one analog card rack mounted in a frame attached to a front panel assembly, and two dc/dc converter assemblies. The chassis, which includes the card racks, frame, and front panel assembly, is contained in a case assembly. Refer to TM 9-1430-655-20-1 for cabling diagrams depicting the MTS installation. Refer to table 7-1 for a cross-reference of part numbers and drawing numbers for major system equipment in reference-designator order. Refer to table 7-2 for a detailed cross-reference of major MTS assemblies and components.

   a. Case Assembly. The case is constructed of welded aluminum alloy. Handles on both sides are for carrying it. Filtered air vents on top and bottom allow cooling air to circulate through the interior.

   b. Front Panel Assembly (fig. 7-3). The front panel assembly contains the controls and indicators for the MTS. On the right side of the front panel assembly are four connectors. One connector interfaces with prime power. The other three interface with the probe assembly and the special purpose cable assembly. Behind the access panel on the front panel assembly are two connectors (J6 and J7) and a self-test strip. Connector J6 interfaces with a testable circuit card during individual card test. Connector J7 provides test points for MTS internal logic M&D purposes. The self-test strip interfaces with the probe assembly during self-test. The frame assembly is attached to the front panel assembly with six screws. The front panel assembly contains eight captive fasteners that attach the chassis and the front panel to the case.
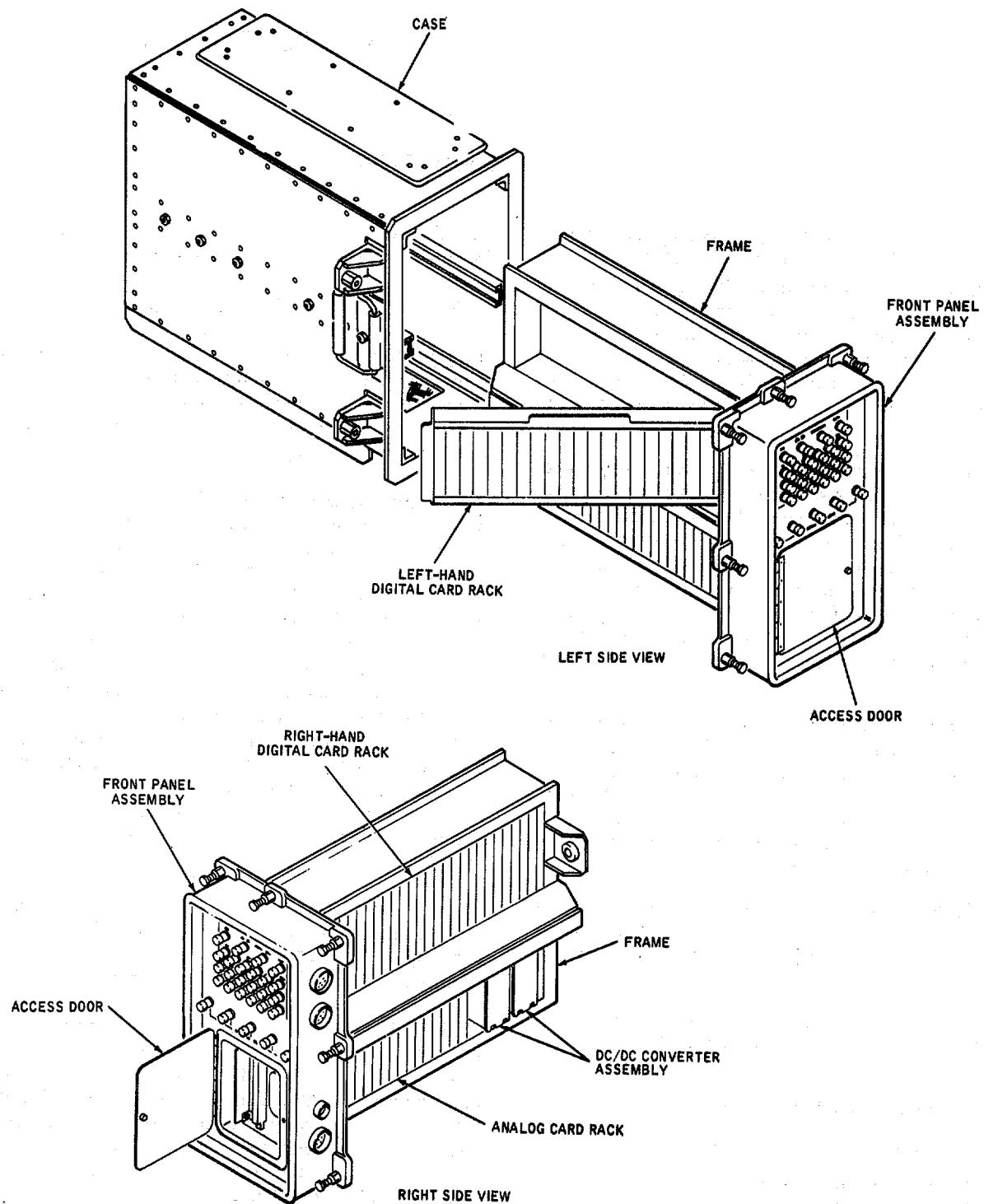
Figure 7-1. Module Test Set Major Assemblies

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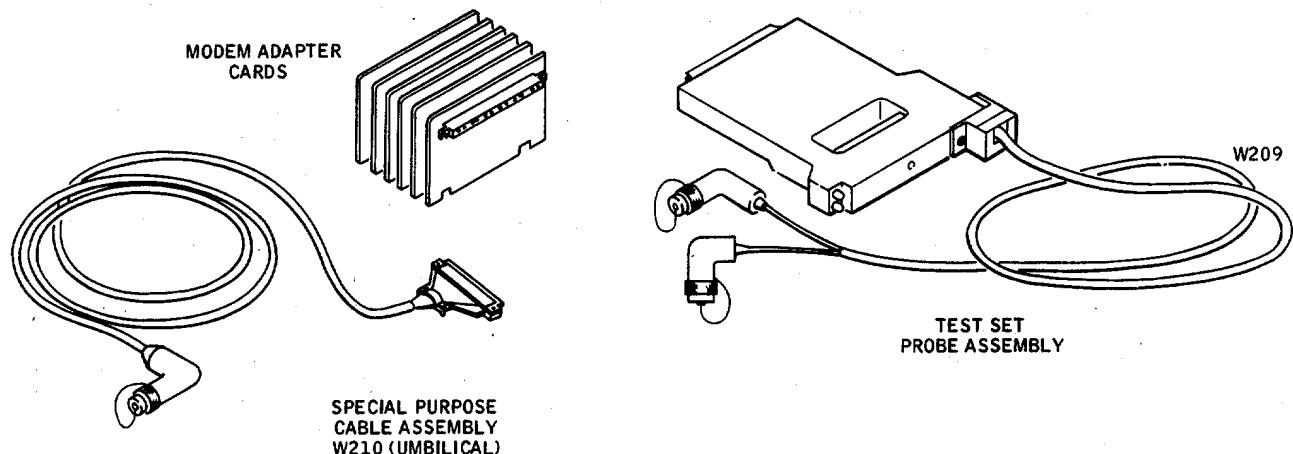
MODEM ADAPTER CARD PART NO.	ADAPTS TO
10281585	CARRIER GENERATOR 10281636
10281586	DATA FORMATTER 10281637
10281587	FREQUENCY DISCRIMINATOR/LOW PASS FILTER 10281638
10281589	DATA SYNCHRONIZER 10281641
10281589	I/O CONTROL NO. 1 10281642
10281590	I/O CONTROL NO. 2 10281643

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Figure 7-2. Module Test Set Accessories and Adapters

Change 2 7-3

c. Frame Assembly. The frame assembly, constructed of welded aluminum alloy, contains the three card racks. Locations on the frame assembly are identified as bays 1, 2, and 3.

d. Card Racks (fig. 7-4). The right hand card rack (A21) and the left-hand card rack (A11) are used for digital cards. The third card rack (A31) contains the analog cards and two dc/dc converter assemblies, PS1 and PS2. All three card racks are of the wire-wrap type. Power and ground are supplied to the circuit cards through the wire-wrap planes. The digital card racks hold 47 cards each, and the analog card rack holds up to 27 cards. Interconnections between the three card racks are provided by cables with connectors that connect to the wire wrap posts of the card rack and by ribbon cables which plug into card slots. The left-hand digital card rack is hinged, allowing it to swing aside and provide access to the wire-wrap side of all card racks.

e. Circuit Card Location. The circuit cards in the MTS are mounted in the digital and analog card racks. Refer to figure 7-5 for individual circuit card locations. Table 7-3 lists the type of circuit card used in each slot of the card cage.

f. Cabling. An overall cabling diagram of the MTS is shown in figure 7-6.

g. Accessories and Adapters. Accessories and adapters (fig. 7-2) supplied with the MTS include the following:

(1) *Test set probe assembly.* The test set probe assembly interfaces between the MTS and the Card Under Test (CUT). The test set probe assembly is attached to the MTS by an 11-foot cable (W209), which permits access to any circuit card in the system without moving the MTS out of the maintenance bench. The probe attaches to etched connectors on the circuit cards by means of a sacrificial connector on the end of the probe during in place testing. Go/no-go condition indicators on the probe permit monitoring test results without observing MTS front-panel indications (which may not be visible from the test location).

(2) *Special purpose (umbilical) cable assembly W210.* The umbilical cable assembly connects the MTS to an MTS interface card/connector in any of the card racks during in-place testing. The umbilical cable permits the MTS to control power application to the unit (rack or card cage) under test.

(3) *Modem adapter cards.* Six modem adapter cards are provided for testing six of the circuit cards contained in each data communication modem. Modem circuit cards cannot be tested in place in the modem card cages.

h. Power Cable W239. The power cable is supplied as part of the system internal shelter cable set. The 6-foot power cable permits inteconnection with the power cabinet through the maintenance bench cable harness.

7-5. Circuit Card Location Index Tables and Key Signal Lookup Tables. Circuit card location index tables and key signal lookup tables provide figure references to functional logic diagrams. They permit rapid access to locating circuit areas corresponding to circuit card locations or when signal mnemonics are known.

a. Circuit Card Location Index. Tables 7-4, 7-5, and 7-6 show the circuit card slots for the left-hand, right-hand, and analog assemblies of the MTS. These tables provide figure and sheet references to the logic diagrams for a circuit card in a particular card slot which is suspect. Since often a card is used for various functional applications, certain cards have several figure references. The circuit card location index table also shows whether a card can be tested by the MTS.

b. Key Signal Lookup. Tables 7-7 thru 7-11 are key signal lookup listings for the left-hand, right-hand, analog, interconnecting, and probe assemblies of the MTS. Key signals are interconnecting signals going between a physical assembly or a functional circuit area as defined by the logic diagrams. Key signals are listed in alphanumerical order. The columns under the distribution heading list connectors (or switches), pin numbers, test points, and foldout numbers with sheet numbers. They appear as follows:

J1214 54 25A FO 1400

An asterisk before the connector indicates the source of the signal. FO refers to a Volume III foldout. The first two digits of the foldout number are the figure number; the last two are the sheet number. (On a figure with only one sheet, the last two digits are zeros.) The connectors or switch designations are represented either by a J, P or S.

Table 7-1. AN/TSQ-73 Major Equipment Cross-Reference

Ref des	Equipment	Part no.	Drawing
-	External Cable Set	10281356-4	10284717
1	Shelter	Multiple	---
	Intra-Shelter Cable Set	10282262	10284718

*Table 7-1. AN/TSQ-73 Major Equipment Cross-Reference
-Continued*

Ref des	Equipment	Part no.	Drawing	
1A1	Equipment Rack	10284818	---	
	Equipment Rack Cable Set	13143776-2	13143904	▮
1A1A1	Rack 1	-	---	
1A1A1A1	RIE II Panel	10282235	WL10282235	
1A1A1A2	Radar Simulator Panel	10281406	WL10281406	
1A1A1A3	Video Simulator Unit (VSU)	10281390	---	
	VSU Wired Card Cage	10281348	WL10281348	
1A1A1A4	Radar Integration Unit (RIU)	10281380	---	
	RIU Bay 1 Wired Card Cage	10281387	WL10281387	
	RIU Bay 2 Wired Card Cage	10281436	WL10281436	
1A1A1A5	Video Processor Unit (VPU)	10281383	---	
	VPU Bay 1 Wired Card Cage	10281388-13	WL10281388-2	▮
	VPU Bay 2 Wired Card Cage	10281422	WL10281422	
1A1A1A6	Radar/Simulator Unit (R/S)	10281614-3	---	▮
	R/S Unit Wired Card Cage	10281615	WL10281615-2	
1A1A1A7	1-Port 16K Memory Unit	13143807	WL13143808	
1A1A1A8	Connector Assembly	13143809	---	
1A1A2	Rack 2	-	---	
1A1A2A1	ADP Status and Control Panel	10284664	WL10284664	
1A1A2A2	Data Comm Control Panel	10281439	WL10281439	
1A1A2A3	Spare	-	---	▮
1A1A2A4	Spare	-	---	
1A1A2A5	Upper Modem (16/16)	10281616	---	
	Upper Modem (10/16)	10284971	---	
	Upper Modem Wired Card Cage	10281617-14	WL10281617-2	▮
1A1A2A6	Data Comm Card Cage	13143920	---	
	Data Comm Wired Card Cage	13143921	WL10281620	
1A1A2A7	Lower Modem (4/16)	10281618	---	
	Lower Modem (2/16)	10284830	--	
	Lower Modem Wired Card Cage	10281650-14	WL10281650	▮
1A1A2A8	Spare	-	---	
1A1A2A9	Spare	-	---	
1A1A3	Rack 3	-	---	
1A1A3A1	Input/Output Unit (IOU)	13143770	---	▮
	IOU Wired Card Cage	13143791	WL13143791	
1A1A3A2	Buffer Unit	13143771	---	▮

Table 7-1. AN/TSQ-73 Major Equipment Cross-Reference
-Continued

Ref des	Equipment	Part no.	Drawing
	Buffer Unit Wired Card Cage	13143792	WL13143792
1A1A3A3	Central Processing Unit (CPU)	13143769	---
1A1A3A4	CPU Bay 1 Wired Card Cage	13143789	WL13143789
	CPU Bay 2 Wired Card Cage	13143790	WL13143790
1A1A3A5 thru 1A1A3A8	4-Port 32K Memory Unit	13143911	WL13143912
1A1A4	RIE I Panel	10281409	WL10281409
1A1A5	ADP Interface Panel	10285182	WL10284551
1A1A6	Radar Interface Panel	10284817	WL10281445
1A2	Power Cabinet	10285434	WL10285434
1A3	Voice Communications Central (VCC)	10284822	---
1A3Al thru 1A3A39	RFI Filter Assembly	MIS-19560	---
1A3A36 thru 1A3A39	RFI Filter Assembly	MIS-19561	---
1A3A40	Communications Patching Panel	10281341	WL10281331
1A3A41	VCC Unit	10281355	WL10282276
1A3A41A1	VCC Control Panel	10281623	WL10281889
1A3A41A2	VCC Wired Card Cage	10281334-2	WL10281334-2
1A4	Maintenance Bench	13143903	---
1A5, 1A6	Display Console	10284960-7	10282130
1A7, 1A17	Data Display Group	10281361-2	WL10281368-2
1A8, 1A13	Magnetic Tape Unit	10285127	WL10285127
	Tape Transport	10285211	WL10285211
	Wired MTU Assembly	10285128	WL10285138
1A9, 1A10	Voice Communications Station (VCS)	10281399-2	---
	Wired VCS Unit	10281625	WL10282287
	VCS Front Panel	10281630-2	WL10281630-2
	VCS Wired Card Cage	10282277	WL10282277
1A11	MCPE (when supplied)	10284806	---
1A12	Keyboard Printer Unit	10281464	---
1A14	Module Test Set (MTS)	13143775-2	---
	Wired MTS Assembly	10281449	WL10281449
	Test Set Probe Assembly	10285061	WL10281447
1A15	Environmental Control Panel	10281477-2	WL10281477

*Table 7-1. AN/TSQ-73 Major Equipment Cross-Reference
-Continued*

Ref des	Equipment	Part no.	Drawing	
			10281565	■
2	Radar Junction Box	10285092-1	WL10285092-3	
3	Display Junction Box	10284920	WL10284920	
4	Motor Generator Set	10285058-5	---	■
5	Diesel Engine Generator	-	---	

Table 7-2. Module Test Set, Major Assembly Cross-Reference

Ref des	Equipment	Part no.	Drawing	
1A14	Module Test Set	13143775-2	---	■
A14A1	Module Test Set wired	10281449	WL10281449	
A11	Left-hand digital card rack (A1101 thru A1147)	10281452-9	WL10281452-1	■
A21	Right-hand digital card rack (A2101 thru A2147)	10281451	WL10281451	
A31	Analog card rack (A3101 thru A3127)	10281453	WL10281453	
PS1	Dc/dc converter	126650-103*	WL126650-80	■
PS2	Dc/dc converter	126649-102*	WL126649-80	
	Test set case assembly	10284883	---	
	Test probe assembly	10288506	WL10281447	

* 126649-101 and 126650-102 are acceptable alternatives for 126649-102 and 126650-103. ■

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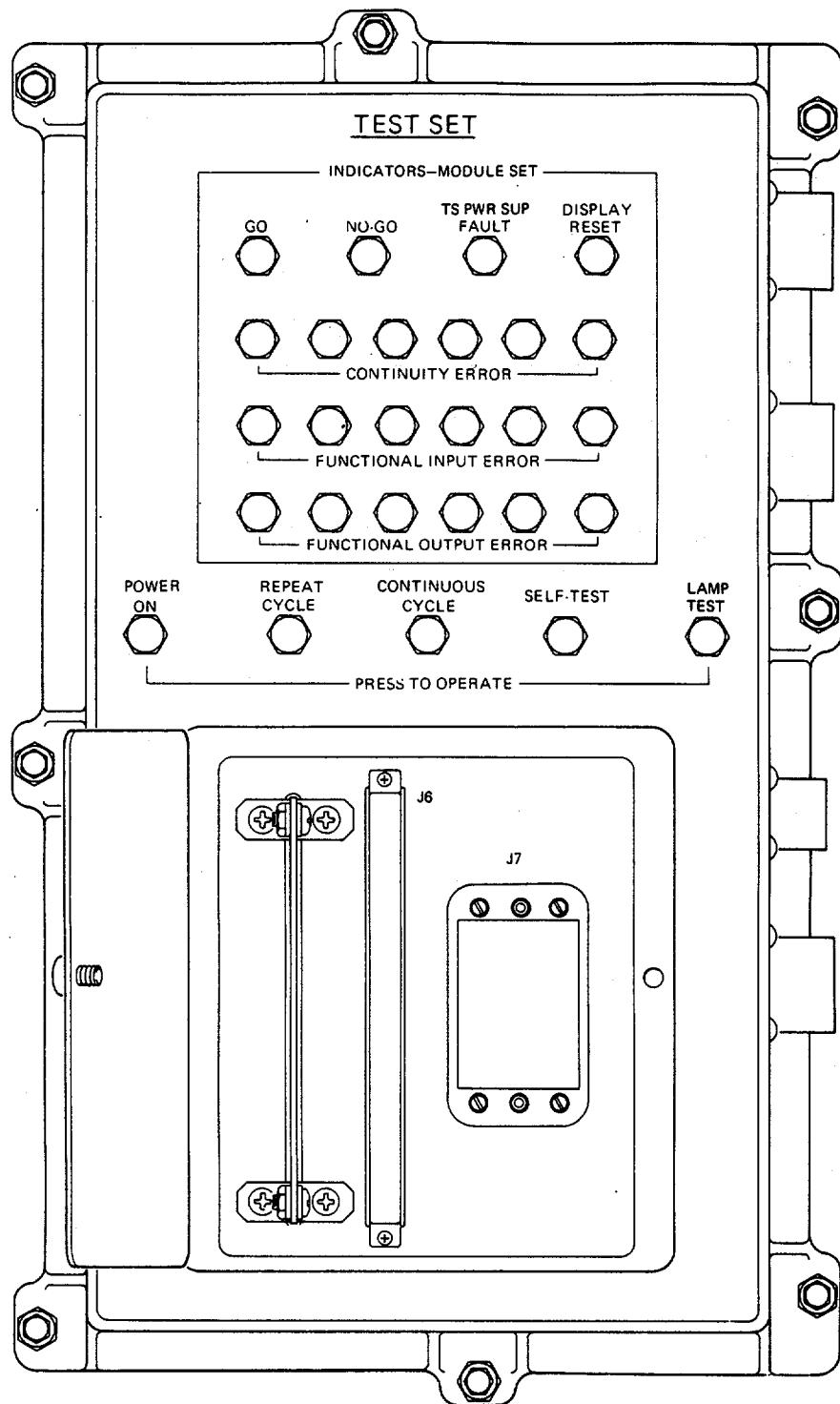
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Figure 7-3. Front Panel Assembly

Change 2 7-8

Table 7-3. Module Test Set, Circuit Card Location

Card slot	Part number	Card type	Color code (zone) 1	2	3	4	
			Left-Hand Digital Card Rack				
A1101	-		-	-	-	-	
A1102	587100-102	4/8-MHz oscillator	-	-	-	-	
A1103	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A1104	587117-102	Hex inverter	Brown	-	Violet	-	
A1105	587105-102	Dual D flip-flop	-	-	Green	-	
A1106	587104-102	Dual 4-input NAND gate	-	-	Yellow	-	
A1107	587103-102	Triple 3-input NAND gate	-	-	Orange	-	
A1108	10281602	Counter/decoder	Brown	Blue	Black	Red	
A1109	587103-102	Triple 3-input NAND gate	-	-	Orange	-	
A1110	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue	
A1111	10282779-1[1]	Test set control memory no.1	Red	Violet	Violet	White	▮
A1112	587117-102	Hex inverter	Brown	-	Violet	-	
A1113	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A1114	10281780	Quad exclusive OR gate	Brown	Violet	Grey	Black	
A1115	10281602	Counter/decoder	Brown	Blue	Black	Red	
A1116	587117-102	Hex inverter	Brown	-	Violet	-	
A1117	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A1118	587118-100	1K-ohm resistor	-	-	-	-	
A1119	10282780-1[1]	Test set control memory no.2	Red	Violet	Gray	Black	▮
A1120	10282781-1[1]	Test set control memory no.3	Red	Violet	Gray	Brown	▮
A1121	10282782-1[1]	Test set control memory no.4	Red	Violet	Gray	Red	▮
A1122	10282783-1[1]	Test set control memory no.5	Red	Violet	Gray	Orange	▮
A1123	10282784-1[1]	Test set control memory no.6	Red	Violet	Gray	Yellow	▮
A1124	10282785-1[1]	Test set control memory no.7	Red	Violet	Gray	Green	▮
A1125	10281602	Counter/decoder	Brown	Blue	Black	Red	
A1126	587103-102	Triple 3-input NAND gate	-	-	Orange	-	
A1127	587117-102	Hex inverter	Brown	-	Violet	-	
A1128	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A1129	587119-100	240-ohm resistor	-	-	-	-	▮
A1130	587105-102	Dual D flip-flop	-	-	Green	-	
A1131	10282786-1[1]	Test set control memory no. 8	Red	Violet	Gray	Blue	▮
A1132	587108-102	Single 8-input NAND gate	-	-	Gray	-	
A1133	587117-102	Hex inverter	Brown	-	Violet	-	

See footnotes at end of table. ▮

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Table 7-3. Module Test Set, Circuit Card Location
-Continued

Card slot	Part number	Card type	Color code (zone)			
			1	2	3	4
A1134	587102-102	Quad 2-input NAND gate	-	-	Red	-
A1135	587103-102	Triple 3-input NAND gate	-	-	Orange	-
A1136	587118-100-	1K-ohm resistor	-	-	-	-
A1137	587106-102	Quad 2-input lamp driver	-	-	Blue	-
A1138	587128-100	Diode/resistor	-	-	-	-
A1139	587128-100	Diode/resistor	-	-	-	-
A1140	587105-102	Dual D flip-flop	-	-	Green	-
A1141	587117-102	Hex inverter	Brown	-	Violet	-
A1142	587102-102	Quad 2-input NAND gate	-	-	Red	-
A1143	-	-	-	-	-	-
A1144	10283505	Test set interface	Orange	Green	Black	Green
A1145	-	-	-	-	-	-
A1146	-	-	-	-	-	-
A1147	W556	Connector	-	-	-	-
RIGHT-HAND DIGITAL CARD RACK						
A2101	W556	Connector	-	-	-	-
A2102	-	-	-	-	-	-
A2103	W552	Connector	-	-	-	-
A2104	W553	Connector	-	-	-	-
A2105	W554	Connector	-	-	-	-
A2106	587102-102	Quad 2-input NAND gate	-	-	Red	-
A2107	587106-102	Quad 2-input lamp driver	-	-	Blue	-
A2108	587117-102	Hex inverter	Brown	-	Violet	-
A2109	587102-102	Quad 2-input NAND gate	-	-	Red	-
A2110	587106-102	Quad 2-input lamp driver	-	-	Blue	-
A2111	587102-102	Quad 2-input NAND gate	-	-	Red	-
A2112	587117-102	Hex inverter	Brown	-	Violet	-
A2113	587106-102	Quad 2-input lamp driver	-	-	Blue	-
A2114	587102-102	Quad 2-input NAND gate	-	-	Red	-
A2115	587102-102	Quad 2-input NAND gate	-	-	Red	-
A2116	587117-102	Hex inverter	Brown	-	Violet	-
A2117	587103-102	Triple 3-input NAND gate	-	-	Orange	-
A2118	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue

7-12

Table 7-3. Module Test Set, Circuit Card Location
-Continued

Card slot	Part number	Card type	Color code (zone) 1	2	3	4	
A2119	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue	
A2120	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue	
A2121	10282787-1[1]	Test set control memory no. 9	Red	Violet	Gray	Violet	▌
A2122	10282788-1[1]	Test set control memory no.10	Red	Violet	Gray	Gray	
A2123	10282789-1[1]	Test set control memory no.11	Red	Violet	Gray	White	
A2124	587117-102	Hex inverter	Brown	-	Violet	-	
A2125	587118-100	1K-ohm resistor	-	-	-	-	
A2126	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A2127	587118-100	1K-ohm resistor	-	-	-	-	
A2128	587117-102	Hex inverter	Brown	-	Violet	-	
A2129	587118-100	1K-ohm resistor	-	-	-	-	
A2130	10282790-1[1]	Test set control memory no.12	Red	Violet	White	Black	▌
A2131	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A2132	587118-100	1K-ohm resistor	-	-	-	-	
A2133	10282791-1[1]	Test set control memory no.13	Red	Violet	White	Brown	▌
A2134	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A2135	587104-102	Dual 4-input NAND gate	-	-	Yellow	-	
A2136	587117-102	Hex inverter	Brown	-	Violet	-	
A2137	10282792-1[1]	Test set control memory no.14	Red	Violet	White	Red	▌
A2138	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A2139	10281602	Counter/decoder	Brown	Blue	Black	Red	
A2140	587103-102	Triple 3-input NAND gate	-	-	Orange	-	
A2141	587117-102	Hex inverter	Brown	-	Violet	-	
A2142	10282793-1[1]	Test set control memory no.15	Red	Violet	White	Orange	▌
A2143	587102-102	Quad 2-input NAND gate	-	-	Red	-	
A2144	587105-102	Dual D flip-flop	-	-	Green	-	
A2145	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue	
A2146	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue	
A2147	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue	

ANALOG CARD RACK

A3101	W554	Connector	-	-	-	-	
A3102	W552	Connector	-	-	-	-	
A3103	W553	Connector	-	-	-	-	

See footnotes at end of table.   ▌

Table 7-3. Module Test Set, Circuit Card Location
- Continued

Card slot	Part number	Card type	Color code (zone)			
			1	2	3	4
A3104	10282752	Line terminator	Red	Violet	Green	Red
A3105	10282752	Line terminator	Red	Violet	Green	Red
A3106	10281785	Reference voltage regulator	Brown	Violet	Gray	Green
A3107	10282794-1[1]	Test set data comparator no. 1	Red	Violet	White	Yellow
A3108	10282795-1[1]	Test set data comparator no. 2	Red	Violet	White	Green
A3109	10282796-1[1]	Test set data comparator no. 3	Red	Violet	White	Blue
A3110	10282797-1[1]	Test set data comparator no. 4	Red	Violet	White	Violet
A3111	10282798-1[1]	Test set data comparator no. 5	Red	Violet	White	Gray
A3112	10282799-1[1]	Test set data comparator no. 6	Red	Violet	White	White
A3113	10282800-1[1]	Test set data comparator no. 7	Red	Gray	Black	Black
A3114	10282801-1[1]	Test set data comparator no. 8	Red	Gray	Black	Brown
A3115	10282802-1[1]	Test set data comparator no. 9	Red	Gray	Black	Red
A3116	10282803-1[1]	Test set data comparator no.10	Red	Gray	Black	Orange
A3117	10282804-1[1]	Test set data comparator no.11	Red	Gray	Black	Yellow
A3118	10282805-1[1]	Test set data comparator no.12	Red	Gray	Black	Green
A3119	10281784	Identification decode	Brown	Violet	Gray	Yellow
A3120	10282771-1[1]	Test set data memory no.1	Red	Violet	Violet	Brown
A3121	10282772-1[1]	Test set data memory no.2	Red	Violet	Violet	Red
A3122	10282773-1[1]	Test set data memory no.3	Red	Violet	Violet	Orange
A3123	10282774-1[1]	Test set data memory no.4	Red	Violet	Violet	Yellow
A3124	10282775-1[1]	Test set data memory no.5	Red	Violet	Violet	Green
A3125	10282776-1[1]	Test set data memory no.6	Red	Violet	Violet	Blue
A3126	10282777-1[1]	Test set data memory no.7	Red	Violet	Violet	Violet
A3127	10282778-1[1]	Test set data memory no.8	Red	Violet	Violet	Gray

[1]Basic P/N is acceptable alternate.

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MODULE TEST SET
1A14

MAINTENANCE
WORK BENCH
POWER DUCT

POWER
CABINET
1A2

J10 | P1   P/O W221   J4 | P2   W239   P1 | J3

P4 | J2   DC/DC
CONVERTER
PS1   J1 | P3

RIGHT HAND
DIGITAL
CARD RACK

J2102
J2106
J2107
J2109
J2110
J2111
J2113
J2115
J2124
J2128
J2132
J2136
J2140

ANALOG
CARD RACK

J3104
J3105
J3106
J3107
J3116
J3117
J3118
J3119
J3123
J3124
J3125
J3126
J3127

J3108
J3109
J3110
J3111
J3112
J3113
J3114
J3115

TO
CARD
UNDER
TEST

TEST PROBE
ASSEMBLY

W209   P1 | J1

P2 | J2

P2 | J2   DC/DC
CONVERTER
PS2   J1 | P1

UNIT
UNDER
TEST

P1   W210   P2 | J4

FRONT-PANEL
AND CHASSIS
MOUNTED
COMPONENTS

INDIVIDUAL
CARD TEST
INPUT

J6

SELF-TEST
TERMINAL
STRIP
INPUT

TB101

LEFT HAND
DIGITAL
CARD RACK

J1136
J1145
J1146

J2103 | P1   W552   P2 | J3102
J2104 | P1   W553   P2 | J3103
J2105 | P1   W554   P3 | J3101

J1147 | P2   W556   P1 | J2101

TEST
CONNECTOR
OUTPUTS

J7

NOTES:

1. TEST PROBE ASSEMBLY AND
EXTERNAL CABLES SHOWN FOR
REFERENCE ONLY.

2. INTERNAL WIRE HARNESS
INTERCONNECTIONS ARE
THROUGH REAR CONNECTORS
ATTACHED TO CARD
CONNECTOR WIRE-WRAP PINS.

3. REFER TO OVERALL SYSTEM
MAINTENANCE MANUAL TM 9-
1430-655-20-1 FOR WIRE
LIST DATA AND CABLE WIRING
DIAGRAMS.

MS 197023

Figure 7-6. Module Test Set Cabling Diagram

7-15 (blank)/7-16

Table 7-4. Left-Hand Digital Card Rack Card Location Index

Card slot	FO-sheet	MTS-testable	Card slot	FO-sheet	MTS-testable
1101	----		1112	1	Yes
1102	9-1	No		4	
				9-1	
1103	1	Yes		14-1	
	4			14-2	
	9-1			16	
	9-2			18-2	
	9-1				
	13				
	14-2		1113	1	Yes
				2	
1104	1	Yes		4	
	4			13	
	9-1			14-2	
	9-2			16	
	12-2		1114	8	Yes
	13			14-2	
	14-2				
	18-2		1115	2	Yes
1105	1	Yes		4	
	4			13	
	9-1		1116	1	Yes
	13			4	
	14-2			9-1	
1106	9-1	Yes		12-2	
	13			14-1	
	14-1			14-2	
	17			18-2	
	18-1			18-3	
	18-2		1117	1	Yes
	22			4	
1107	1	Yes		9-2	
	16			13	
	17			14-2	
	18-1			15-4	
	18-3			22	
1108	13	Yes	1118	4	No
	14-2			9-1	
	16			12-1	
				12-2	
1109	1	Yes		14-2	
	4			17	
	9-1			18-2	
	13			18-3	
	14-1		1119	12-3	No
	18-2				
1110	9-2	Yes	1120	12-1	No
	12-2			12-3	
	14-1		1121	12-1	No
	18-2			12-2	
1111	4		1122	12-3	No
	14-2				

Table 7-4. Left-Hand Digital Card Rack Card Location Index - Continued

Card slot	FO-sheet	MTS-testable	Card slot	FO-sheet	MTS-testable
1123	12-1 12-3	No	1133	1 2 3 9-1 17 18-1 18-3 22	Yes
1124	12-1 12-2	No			
1125	2 3 4 12-2 14-2	Yes			
			1134	8 15-4 17 18-1 18-2 18-3 19 22	Yes
1126	1 2 16 17 18-2 18-3	Yes			
1127	2 3 8 12-2 14-2 16 17 18-1 3	Yes	1135	2 14-2 17 18-3 19- 19	Yes
			1136	2 8 18-2 18-3 22 23	No
1128	1 2 8 9-1 16 17 18-1 22	Yes			
			1137	2 17 18-23 22	Yes
1129	12-2 23	Yes			
1130	2 9-1 14-2 17 18-1	Yes	1138	23	No
			1139	23	No
1131	2 3 8	No	1140	1 2 9-1 12-2 18-1 18-3 22	Yes
1132	2 8 14-2 17 22	Yes			

Table 7-4. Left-Hand Digital Card Rack Card Location Index - Continued

Card slot	FO-sheet	MTS-testable	Card slot	FO-sheet	MTS-testable
1141	9-1	Yes		16	
	12-2			17	
	17			18-1	
	18-1			18-2	
	18-2			22	
	18-3				
	19		1143	----	
	22		1144	(TBS)	
	23		1145	----	
1142	1	Yes			
	9-1		1146	----	
	15-4		1147	----	

Table 7-5. Right-Hand Digital Card Rack Card Location Index

Card slot	FO-sheet	MTS-testable	Card slot	FO-sheet	MTS-testable
2101	----		2107	15-1	Yes
2102	----		2108	13	Yes
2103	----			15-1	
	----			15-4	
2104	----		2109	15-1	Yes
2105	---			15-2	
2106	15-1	Yes		15-3	
	15-2		2110	15-2	Yes
	15-3		2111	15-2	Yes
2112	15-2	Yes	2131	6-1	Yes
	15-4			6-2	
2113	15-3	Yes		6-3	
2114	15-2	Yes	2132	3	No
	15-3			6-2	
				6-3	
2115	15-3			6-4	
2116	15-3	Yes	2133	6-2	No
	15-4			6-3	
2117	5	Yes	2134	5	Yes
	6-1			6-2	
	6-2			6-3	
	6-3			6-4	

Table 7-5. Right-Hand Digital Card Rack Card Location Index - Continued

Card slot	FO-sheet	MTS-testable	Card slot	FO-shoot	MTS-testable
	15-1				
	15-2		2135	5	Yes
	15-3			6-4	
2118	10	Yes		15-1	
2119	10	Yes	2136	3	Yes
				6-4	
2120	10	Yes	2137	6-4	No
2121	7-1	No	2138	3	Yes
2122	7-1	No		5	
	7-2			6-2	
2123	7-2	No		6-4	
2124	6-1	Yes		6-5	
	6-2		2139	3	Yes
	7-1		2140	15-4	
	10		2141	3	Yes
2125	7-1	No		5	
	7-2			14-1	
2126	6-1	Yes		15-4	
	6-2		2142	3	No
2127	10		2143	5	Yes
	23			6-4	
2128	6-2	Yes	2144	5	Yes
	6-3				
	64		2145	14-1	Yes
	7-1		2146	14-1	Yes
2129	6-1	No	2147	14-1	Yes
	6-2		2148	---	
	6-3				
2130	6-1	No			
	6-2				

Table 7-6. Analog Card Rack Card Location Index

Card slot	FO-sheet	MTS-testable		Card slot	FO-sheet	MTS-testable
3101	----			3113	20-2	No
3102	----				21-3	
					23	
3103	----			3114	20-2	No
3104	21-2	No			21-3	
	21-3				23	
3105	21-3	No		3115	20-2	No
	21-4				21-4	
3106	19	No			23	
3107	20-1	No		3116	20-2	No
	21-2				21-4	
	23.				23	
3108	20-1	No		3117	20-2	No
	20-2				21-4	
	21-2				23	
	23			3118	19	No
					20-2	
3109	20-1	No			2134	
	21-2				23	
	23					
3110	20-1	No		3119	19	No
	21-2			3120	11-1	No
	23			3121	11-2	No
3111	20-2	No		3122	11-3	No
	21-3					
	23			3123	11-4	No
3112	20-2	No		3124	11-5	No
	2133			3125	11-6	No
	23			3126	11-7	No
				3127	11-8	No

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup

Signal												
					Distribution							
HAFTBQ	J1147	70		F00500	J1128	68	32A	F00200				
HAFTCOV	J1147	38		F00500	J1142	73	36B	F01801				
HAT183E	J1147	22		F01401	J1106	06	05A	F01401				
HBBARA	*J1117	69	35A	F00100	J1140	73	36B	F00100				
HBBASA	*J1117	80	39A	F00100	J1140	65	34B	F00100				
HBBA7P	*J1140	69	35A	F00100	J1137	76	37A	F01802				
HBBA7Q	*J1140	74	35B	F00100	J1135	65	34B	F00100				
HBBBRA	*J1117	60	28A	F00100	J1105	04	04A	F00100				
HBBBSA	*J1117	66	31A	F00100	J1105	03	02A	F00100				
HBBB7P	*J1105	09	04B	F00100	J1113	05	02B	F00100	J1113	10	07A	F00100
	J1126	61	32B	F00100	J1126	75	37B	F00100	J1126	78	38A	F00100
	J1126	72	34A	F00100								
HBBB7Q	*J1105	07	03A	F00100	J1128	18	10A	F00100				
HBBIER	*J1126	43	23B	F00100	J1117	62	29A	F00100	J1117	70	33A	F00100
	J1117	74	35B	F00100	J1117	78	38A	F00100	J1107	10	07A	F00100
HBBIES	*J1107	04	04A	F00100	J1112	52	26A	F00100	J1112	69	35B	F00100
	J1126	41	22B	F00100								
HBBP1A	J1147	31		F01508	*J1117	30	15A	F01508				
HBBP2A	J1147	33		F01508	J1117	33	16B	F01508				
HBBP3A	J1147	34		F01508	*J1117	39	19B	F01508				
HBB01AV	J1128	08	06A	F00100	*J1127	19	10B	F00100				
HBB02A	J1128	10	07A	F00100	J1128	04	04A	F00100	*J1113	06	05A	F00100
HBB03AV	J1128	05	03B	F00100	*J1127	26	12B	F00100				
HBB04A	J1135	57	30B	F00100	*J1128	14	09A	F00100				
HBB05A	J1135	59	31B	F00100	*J1126	63	33B	F00100				
HBB06A	J1135	61	32B	F00100	*J1126	73	36B	F00100				
HBB07A	*J1128	22	12A	F00100	J1117	76	37A	F00100	J1116	76	37A	F00100
HBB070V	*J1116	78	36A	F00100	J1117	65	34B	F00100				
HBB08A	J1135	71	36A	F00100	*J1126	74	35B	F00100				
HBB09A	J1135	72	34A	F00100	*J1126	80	39A	F00100				
HBB10A	J1128	03	02A	F00100	*J1127	30	14B	F00100				
HBB11A	J1128	11	05B	F00100	J1128	07	03A	F00100	*J1113	01	02B	F00100
HBB12AV	J1128	13	06B	F00100	J1127	31	16B	F00100				
HBB130	*J1128	21	10B	F00100	J1113	03	02A	F00100				

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBB14O	*J1128	27	13B	F00100	J1113	07	03A	F00100				
HBB15A	J1133	59	31B	F00100	J1116	04	02A	F01803	J1116	05	03B	F01803
	*J1113	09	04B	F00100	J1107	30	15A	F01801	J1107	40	19A	F01801
HBB21O	J1131	37		F00200	*J1128	06	05A	F00100				
HBB22O	J1131	39		F00200	*J1128	01	02B	F00100				
HBB23O	J1135	63	33B	F00100	J1131	41		F00200				
HBB24O	J1135	74	35B	F00100	J1131	49		F00200				
HBB25O	J1131	51		F00200	*J1128	09	04B	F00100				
HBB26O	J1131	53		F00200	*J1128	15	07B	F00100				
HBB27A	*J1117	52	24A	F00100	J1103	34	16A	F00100				
HBB27R	*J1109	27	13B	F00100	J1103	36	17A	F00100				
HBB27S	*J1103	30	15A	F00100	J1109	21	10B	F00100	J1128	17	08B	F00100
	J1127	21	11B	F00100	J1126	77	38B	F00100				
HBB28A	*J1117	51	27B	F00100	J1109	23	11B	F00100				
HBB29A	*J1128	69	35A	F00100	J1103	29	14B	F00100				
HBB29R	*J1109	31	15B	F00100	J1103	31	15B	F00100				
HBB29S	*J1103	33	16B	F00100	J1109	39	14B	F00100	J1128	19	09B	F00100
	J1127	27	13B	F00100	J1126	71	36A	F00100	J1137	78	38A	F01802
HBB30A	*J1128	80	39A	F00100	J1109	30	15A	F00100				
HBB31A	*J1109	39	19B	F00100	J1103	40	19A	F00100				
HBB31R	*J1109	36	17A	F00100	J1103	42	20A	F00100				
HBB31S	*J1103	38	18A	F00100	J1109	38	18A	F00100	J1126	69	35A	F00100
	J1126	57	30B	F00100	J1127	36	16A	F00100	J1128	20	11A	F00100
	J1113	04	04A	F00100								
HBB32A	*J1103	21	10B	F00100	J1109	40	19A	F00100				
HBB33A	*J1103	39	19B	F00100	J1105	17	08B	F00100				
HBB33Q	*J1105	19	09B	F00100	J1128	23	11B	F00100	J1127	29	15B	F00100
	J1126	59	31B	F00100								
HBB34A	*J1103	66	31A	F00100	J1105	20	11A	F00100				
HBB35A	*J1109	74	35B	F00100	J1105	27	13B	F00100				
HBB35Q	*J1105	25	12B	F00100	J1128	25	12B	F00100	J1127	33	17B	F00100
	J1126	76	37A	F00100								
HBB36A	*J1109	80	39A	F00100	J1105	22	12A	F00100				
HBB37AV	J1128	76	37A	F00100	J1128	74	35B	F00100	J1117	56	26A	F00100
	J1117	47	25B	F00100	*J1112	70	34B	F00100	J1109	35	17B	F00100
	J1103	17	08B	F00100								

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBB38AV	*J1112	54	25A	F00100	J1109	65	34B	F00100	J1109	69	35A	F00100
	J1103	68	32A	F00100	J1103	35	17B	F00100				
HBB39OV	*J1116	71	36B	F00100	J1117	49	26B	F00100				
HBB40OV	*J1116	72	34A	F00100	J1128	78	38A	F00100				
HBB41OV	*J1116	77	38A	F00100	J1103	19	09B	F00100				
HBB42OV	*J1104	43	24B	F00100	J1103	70	33A	F00100				
HBB43OV	*J1112	71	36B	F00100	J1109	76	37A	F00100				
HBB51OV	J1107	76	37A	F00100	*J1133	57	30B	F00100	J1135	48	22A	F01803
HBB52A	*J1107	80	39A	F00100	J1142	79	39B	F00100	J1134	40	19A	F01803
HBB53A	*J1113	66	31A	F00100	J1146	78		F00100				
HBB53O	J1113	70	33A	F00100	*J1142	75	37B	F00100				
HBCASA	J1142	35	17B	F02200	*J1128	66	31A	F00200	J1113	61	32B	F00200
HBCA1B1	*J1124	62	T17	F01201	J1123	62	T17	F01203	J1122	62	T17	F01203
	J1122	38	T09	F01203	J1123	38	T09	F01203	J1124	38	T09	F01201
	J1124	15	T01	F01202	J1123	15	T01	F01201	J1122	15	T01	F01203
	J1118	05		F01201	J1108	39	18B	F01300				
HBCA2B1	*J1124	64	T18	F01201	J1123	64	T18	F01203	J1122	64	T18	F01203
	J1122	40	T10	F01203	J1123	40	T10	F01203	J1123	40	T10	F01201
	J1124	18	T02	F01202	J1123	18	T02	F01201	J1122	18	T02	F01203
	J1118	06		F01201	J1108	41	19B	F01300				
HBCA3B1	*J1124	66	T19	F01201	J1123	66	T19	F01203	J1122	66	T19	F01203
	J1122	42	T11	F01203	J1123	42	T11	F01203	J1124	42	T11	F01201
	J1124	20	T03	F01202	J1123	20	T03	F01201	J1122	20	T03	F01203
	J1118	07		F01201	J1108	43	22B	F01300				
HBCA4B1	*J1124	68	T21	F01201	J1123	68	T21	F01203	J1122	68	T21	F01203
	J1122	46	T12	F01203	J1123	46	T12	F01203	J1124	46	T12	F01201
	J1124	22	T04	F01202	J1123	22	T04	F01201	J1122	22	T04	F01203
	J1118	08		F01201	J1108	45	23B	F01300				
HBCA5B1	*J1424	70	T20	F01201	J1123	70	T20	F01203	J1122	70	T20	F01203
	J1122	48	T13	F01203	J1123	48	T13	F01203	J1124	48	T13	F01201
	J1124	24	T05	F01202	J1123	24	T05	F01201	J1122	24	T05	F01203
	J1118	09		F01201	J1115	39	18B	F01300				
HBCA6B1	*J1124	72	T22	F01201	J1123	72	T22	F01203	J1122	72	T22	F01203
	J1122	50	T14	F01203	J1123	50	T14	F01203	J1124	50	T14	F01201
	J1124	26	T06	F01202	J1123	26	T06	F01201	J1122	26	T06	F01203
	J1118	10		F01201	J1115	41	19B	F01300				

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution										
HBCA7B1	*J1124	74	T23	F01201	J1123	74	T23	FO1203	J1122	74	T23	FO1203
	J1122	52	T15	F01203	J1123	52	T15	FO1203	J1124	52	T15	FO1201
	J1124	29	T07	F01202	J1123	29	T07	FO1201	J1123	29	T07	FO1203
	J1118	17		F01201	J1115	43	22B	FO1300				
HBCA8B1	*J1124	76	T24	F001201	J1123	76	T24	FO1203	J1122	76	T24	FO1203
	J1122	54	T16	F01203	J1123	54	T16	FO1203	J1124	54	T16	FO1201
	J1124	34	T08	F01202	J1123	34	T08	FO1201	J1122	34	T08	FO1203
	J1118	18		F01201	J1115	45	23B	FO1300				
HBCB1B1	J1108	53	26B	FO1300	J1119	62	T17	FO1202	J1120	62	T17	FO1203
	*J1121	62	T17	FO1201	J1121	38	T09	FO1201	J1119	38	T09	FO1203
	J1120	38	T09	FO1203	J1121	15	T01	FO1202	J1120	15	T01	FO1201
	J1119	15	T01	FO1203	J1118	19		FO1201				
HBCB2B1	J1108	55	27B	FO1300	*J1121	64	T18	FO1201	J1120	64	T18	FO1203
	J1119	64	T18	FO1203	J1119	40	T10	FO1203	J1120	40	T10	FO1203
	J1121	40	T10	FO1201	J1121	18	T02	FO1202	J1120	18	T02	FO1201
	J1119	18	T02	FO1203	J1118	20		FO1201				
HBCB3B1	*J1121	66	T19	FO1201	J1120	66	T19	FO1203	J1119	66	T19	FO1203
	J1119	42	T11	FO1203	J1120	42	T11	FO1203	J1121	42	T11	FO1201
	J1121	20	T03	FO1202	J1120	20	T03	FO1201	J1119	20	T03	FO1203
	J1118	24		FO1201	J1110	71	35B	FO1202				
HBCB4B1	*J1121	68	T21	FO1201	J1120	68	T21	FO1203	J1119	68	T21	FO1203
	J1119	46	T12	FO1203	J1120	46	T12	FO1203	J1121	46	T12	FO1201
	J1121	22	T04	FO1202	J1120	22	T04	FO1201	J1119	22	T04	FO1203
	J1118	26		FO1201	J1110	69	34B	FO1202				
	J1119	48	T13	FO1203	J1120	48	T13	FO1203	J1121	48	T13	FO1201
	J1121	24	T05	FO1202	J1120	24	T05	FO1201	J1119	24	T05	FO1203
HBCB5B1	J1118	23		FO1201	J1110	70	34A	FO1202				
HBCB6B1	J1110	72	35A	FO1202	J1118	25		FO1201	J1119	26	T06	FO1203
	J1120	26	T06	FO1201	J1121	26	T06	FO1202	J1121	50	T14	FO1201
	J1120	50	T14	FO1203	J1119	50	T14	FO1203	J1119	72	T22	FO1203
	J1120	72	T22	FO1203	*J1121	72	T22	FO1201				
HBCB7B1	J1140	40	19A	FO1202	*J1121	74	T23	FO1201	J1120	74	T23	FO1201
	J1119	74	T23	FO1203	J1119	52	T15	FO1203	J1120	52	T15	FO1203
	J1121	52	T15	FO1201	J1121	29	T07	FO1202	J1120	29	T07	FO1201
	J1119	29	T07	FO1203	J1118	29		FO1201				
HBCB8B1	J1126	14	09A	FO1802	*J1121	76	T24	FO1201	J1120	76	T24	FO1203

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
	J1119	76	T24	FO1203	J1119	54	T16	FO1203	J1120	54	T16	FO1203
	J1121	54	T16	FO1201	J1121	34	T08	FO1202	J1120	34	T08	FO1201
	J1119	34	T08	FO1203	J1118	30		FO1201	J1112	38	20A	FO1300
HBCCPOV	J1104	48	21A	FO1202	J1140	42	20A	FO1202				
HBCCRAV	J1115	05	03B	FO0400	J1115	21	10B	FO0400	J1110	74	36A	FO1202
	*J1116	68	32B	FO1202	J1125	21	10B	FO1202				
HBCCTP	J1109	01	02B	FO0901	J1110	26	13A	FO1401	J1110	40	19A	FO1401
	*J1105	45	24B	FO1402	J1104	65	33B	FO1402				
HBCCTQ	J1110	22	11A	FO1401	J1110	36	17A	FO1401	J1105	43	23B	FO1402
	J1104	59	31B	FO1402	J1108	80	38B	FO1402	J1113	79	39B	FO1402
	J1125	80	38B	FO1402								
HBCC3Q	J1125	19	09B	FO1402	J1140	37	18B	FO1402				
HBCGA5U	J1125	79	37B	FO1402	J1113	55	29B	FO1402	J1108	68	33A	FO1402
HBCGB5U	J1125	68	33A	FO1402	J1113	53	28B	FO1402				
HBCGCA	J1117	79	39B	FO1402	*J1113	57	30B	FO1402	J1103	77	38B	FO1402
HBCGDAV	J1147	39		FO1402	*J1104	68	32B	FO1402				
HBCGEAV	J1147	40		FO1402	*J1104	57	30B	FO1402				
HBCGFA	J1147	41		FO1402	*J1117	75	37B	FO1402				
HBCGFO	J1117	77	38B	FO1402	*J1103	57	30B	FO1402				
HBCG20	J1125	59	32A	FO1402	J1108	69	32A	FO1402	*J1103	63	33B	FO1402
HBCID1V	*J1131	38	T09	FO0200								
HBCID2V	*J1131	40	T10	FO0200								
HBCID3V	*J1131	42	T11	FO0200								
HBCID4V	*J1131	46	T12	FO0200								
HBCID5V	*J1131	48	T13	FO0200								
HBCID6V	*J1131	50	T14	FO0200								
HBCID7V1	J1140	18	10A	FO0200	J1137	35	17B	FO0200	J1137	29	14B	FO0200
	J1137	23	11B	FO0200	J1137	24	13A	FO0200	J1137	18	10A	FO0200
	J1137	17	08B	FO0200	J1136	56		FO0200	*J1131	52	T15	FO0200
	J1126	09	04B	FO0200								
HBCID8V1	J1106	68	32A	FO2200	*J1131	54	T16	FO0200	J1136	62		FO0200
HBCI0B1	J1147	01		FO0200	J1137	22	12A	FO0200	J1136	48		FO0200
	J1131	60		FO0300	*J1131	38	T09	FO0200	J1131	13		FO0800
	J1108	04	02A	FO1600	J1111	37		FO1402	J1111	60		FO1402
HBCI1B1	J1147	03		FO0200	J1137	14	09A	FO0300	J1136	52		FO0200
	J1131	59		FO0300	*J1131	40	T10	FO0200	J1131	17		FO0800

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
	J1111	39		FO1402	J1111	59		FO0400	J1108	06	03A	FO1600
HBCI2B1	J1108	03	02B	FO1600	J1111	41		FO1402	J1111	61		FO0400
	J1131	61		FO0300	*J1131	42	T11	FO0200	J1131	19		FO0800
	J1137	21	10B	FO0200	J1136	54		FO0200	J1147	04		FO0200
HBCI3B1	J1147	05		FO0200	J1137	27	13B	FO0200	J1136	51		FO0200
	*J1131	46	T12	FO0200	J1131	25		FO0800	J1131	69		FO0300
	J1111	69		FO0400	J1111	49		FO1402	J1108	20	10A	FO1600
HBCI4B1	J1135	05	03B	FO1802	J1147	06		FO0200	J1137	33	16B	FO0200
	J1136	53		FO0200	*J1131	48	T13	FO0200	J1131	27		FO0800
	J1131	71		FO0300	J1111	71		FO0400	J1111	51		FO1402
	J1108	22	11A	FO1600								
HBCI5B1	J1147	07		FO0200	J1137	39	19B	FO0200	J1136	55		FO0200
	*J1131	50	T14	FO0200	J1131	31		FO0800	J1131	73		FO0300
	J1111	73		FO0400	J1111	53		FO1402	J1108	19	09B	FO1600
HBCKBA	*J1134	80	39A	FO1507	J1147	20		FO1507				
HBCK1A	J1104	04	02A	FO0901	J1104	06	05A	FO0901	J1104	05	03B	FO0901
	J1102	19		FO0901								
HBCK1O	J1102	21		FO0901	J1105	30	15A	FO0901	J1105	42	20A	FO0901
	J1130	42	20A	FO0901								
HBCK1OV	*J1116	63	30A	FO1202	J1117	34	16A	FO1507				
HBCK2O	J1113	77	38B	FO1402	J1109	09	04B	FO0901	*J1102	25		FO0901
HBCK2OV	*J1116	60	28A	FO1202	J1117	29	14B	FO1507				
HBCK3OV	*J1116	56	28B	FO1202	J1117	35	17B	FO1507				
HBCK4A	J1102	37		FO0901	J1133	17	09B	FO0901				
HBCK4O	J1102	26		FO0901	J1102	33		FO0901				
HBCK4OV	J1117	43	23B	FO1507	*J1116	57	30B	FO1202				
HBCK5OV	*J1141	10	06B	FO1202	J1142	61	32B	FO1507				
HBCK6OV	J1141	18	09A	FO1202	J1142	13	06B	FO1507				
HBCK7OV	*J1127	80	38B	FO1202	J1134	76	37A	FO1507				
HBCPAA	*J1142	63	33B	FO1507	J1147	50		FO1507				
HBCP0A	*J1142	15	07B	FO1507	J1147	46		FO1507				
HBCP1A	J1147	24		FO1300	*J1117	06	05A	FO1300	J1113	78	38A	FO1300
HBCP2A	J1147	25		FO1507	*J1117	01	02B	FO1507				
HBCP3A	J1147	26		FO1507	*J1117	09	04B	FO1507				
HBCP4A	J1147	27		FO1507	*J1117	15	07B	FO1507				
HBCP5A	J1147	29		FO1507	*J1117	22	12A	FO1507				

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBCP6A	J1147	30		FO1507	*J1117	14	09A	FO1507				
HBCP7A	J1147	35		FO1507	*J1117	21	10B	FO1507				
HBCP8A	J1147	36		FO1507	*J1117	27	12B	FO1507				
HBCP9A	J1147	37		FO1507	*J1117	38	18A	FO1507				
HBCR1P	J1128	40	19A	FO1700	J1128	64	30A	FO1700	*J1140	21	10B	FO0200
HBCR1Q	J1126	11	05B	FO0200	J1130	18	10A	FO0200	*J1140	19	09B	FO0200
HBCR2P	J1142	71	36A	FO1801	*J1130	21	10B	FO0200	J1126	13	06B	FO0200
HBCR2Q	J1135	68	32A	FO1402	*J1130	19	09B	FO0200	J1105	48	22A	FO1402
HBCSCO	J1132	40	19A	FO0200	J1125	37	17B	FO0200	J1115	51	25B	FO0200
	*J1113	63	33B	FO0200								
HBCSMR	J1135	78	38A	FO0200	*J1126	55	29B	FO0200				
HBCSMS	*J1135	80	39A	FO0200	J1128	70	33A	FO0200	J1126	53	28B	FO0200
HBCSSA	J1135	76	37A	FO0200	*J1126	15	07B	FO0200				
HBCSTD6	*J1137	57	30B	FO0200	J1138	17		FO2300	J1138	05		FO2300
	J1145	65		FO0200								
HBCSTR	J1128	55	29B	FO0200	*J1126	64	30A	FO0200				
HBCSTS	J1137	53	28B	FO0200	*J1128	57	30B	FO0200	J1126	66	31A	FO0200
HBCS2A	J1125	78	38A	FO1402	*J1113	75	37B	FO1402	J1103	61	32B	FO1402
	J1103	55	29B	FO1402	J1106	08	06A	FO1401				
HBCTD1U	J1133	04	02A	FO0200	J1132	30	15A	FO0200	*J1125	38	18A	FO0200
HBCTD2U	J1133	05	03B	FO0200	*J1125	40	19A	FO0200				
HBCTD3U	J1133	09	05B	FO0200	J1132	31	15B	FO0200	*J1125	42	20A	FO0200
HBCTD4U	J1133	15	07B	FO0200	J1132	38	18A	FO0200	*J1125	46	21A	FO0200
HBCTD5U	*J1125	36	17A	FO0200	J1115	61	31B	FO0200				
HBCTE1U	J1133	23	12A	FO0200	J1132	37	18B	FO0200	*J1115	54	26A	FO0200
HBCTE2U	J1133	20	10A	FO0200	*J1115	56	28B	FO0200				
HBCTRAV	J1142	37	18B	FO2200	J1140	20	11A	FO0200	J1130	20	11A	FO0200
	J1126	62	29A	FO0200	*J1127	40	19A	FO0200	J1125	35	16B	FO0200
	J1115	49	24B	FO0200								

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBCTSA	J1134	77	38B	FO1801	*J1132	35	17B	FO0200	J1128	53	28B	FO0200
HBCT1AV	J1137	26	14A	FO0200	*J1133	03	03A	FO0200				
HBCT2AV	J1137	20	11A	FO0200	*J1133	01	02B	FO0200	J1132	36	17A	FO0200
HBCT3AV	J1137	19	09B	FO0200	*J1133	07	04B	FO0200				
HBCT4AV	J1137	25	12B	FO0200	*J1133	10	06B	FO0200				
HBCT5AV	J1137	31	15B	FO0200	*J1133	25	11A	FO0200				
HBCT6AV	*J1133	18	09A	FO0200	J1132	34	16A	FO0200	J1137	37	18B	FO0200
HBCVRAV	J1105	50	23A	FO1402	*J1104	56	28B	FO1402				
HBCVRO	J1104	55	29B	FO1402	*J1103	75	37B	FO1402				
HBCWAOV	*J1141	78	36A	FO0500	J1135	66	31A	FO1402				
HBCWDOE	*J1110	75	37B	FO1202	J1109	68	32A	FO1300	J1109	45	24B	FO1300
	J1109	41	22B	FO1300	J1105	54	25A	FO1300				
HBCWD1E	*J1110	79	39B	FO1202	J1109	46	21A	FO1300	J1112	29	15B	FO1300
HBCWD2E	*J1110	80	39A	FO1202	J1125	20	10A	FO1202				
HBCWD3E	*J1110	76	37A	FO1202	J1125	22	11A	FO1202				
HBCWM1T	J1116	61	31A	FO1202	*J1125	26	13A	FO1202				
HBCWM2T	J1116	62	29A	FO1202	*J1125	27	14A	FO1202				
HBCWM3T	J1116	55	29B	FO1202	*J1125	30	15A	FO1202				
HBCWM4T	J1116	59	31B	FO1202	*J1125	33	16A	FO1202				
HBCWM5T	*J1125	23	11B	FO1202	J1141	15	07B	FO1202				
HBCWM6T	*J1125	25	12B	FO1202	J1141	20	10A	FO1202				
HBCWM7T	*J1125	29	13B	FO1202	J1127	79	39B	FO1202				
HBCO1D	*J1137	22	12A	FO0200								
HBC02D	*J1137	14	09A	FO0200								
HBC04D	*J1137	21	10B	FO0200								
HBC08D	*J1137	27	13B	FO0200								
HBC016D	*J1137	33	16B	FO0200								
HBC032D	*J1137	39	19B	FO0200								
HBEVSAV	*J1104	60	28A	FO1802	J1106	73	36B	FO1801	J1107	03	02A	FO1801
HBEVSO	*J1142	57	30B	FO1802	J1137	59	31B	FO1802	J1128	73	36B	FO1801
	J1104	62	29A	FO1802								
HBFAAOV	*J1141	07	04B	FO1802	J1137	77	38B	FO1802				
HBFABA	J1141	09	05B	FO1802	*J1135	07	03A	FO1802				
HBFABD1	J1146	32		FO1802	*J1137	72	34A	FO1802	J1118	63		FO1802
HBFACA	*J1142	80	39A	FO1802	J1141	23	12A	FO1802				
HBFACD1	J1146	16		FO1802	*J1137	75	37B	FO1802	J1118	61		FO1802
HBFACOV	J1146	70		FO1802	*J1141	25	11A	FO1802				

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBFACR	J1137	40	19A	FO1803	J1137	70	33A	FO1700	J1137	08	06A	FO1700
	*J1135	04	04A	FO1802	J1134	10	07A	FO1802	J1126	34	16A	FO1600
HBFACS	J1142	76	37A	FO1802	J1135	06	05A	FO1802	*J1134	06	05A	FO1802
	J1137	79	39B	FO1802	J1137	73	36B	FO1802	J1116	79	39B	FO1802
HBFADD1	J1146	53		FO1802	*J1137	06	05A	FO1802	J1136	07		FO1802
HBFAEO	J1146	74		FO1802	*J1126	27	13B	FO1802				
HBFAGA	J1146	71		FO1802	*J1109	04	04A	FO1802				
HBFAHOV	*J1141	24	13A	FO1802	J1109	08	06A	FO1802				
HBFAIAV	*J1112	48	21A	FO1802	J1110	08	04A	FO1802				
HBFAJR	J1142	24	13A	FO1802	*J1134	21	10B	FO1802	J1135	60	28A	FO1802
HBFAJS	J1146	56		FO1802	*J1142	22	12A	FO1802	J1134	19	09B	FO1802
HBFAKR	J1142	18	10A	FO1802	*J1134	27	13B	FO1802	J1135	62	29A	FO1802
HBFAKS	J1146	57		FO1802	*J1142	14	09A	FO1802	J1134	23	11B	FO1802
HBFALA	J1142	26	14A	FO1802	*J1126	07	03A	FO1802				
HBFAMR	*J1135	20	11A	FO1802	J1134	26	14A	FO1802	J1126	03	02A	FO1802
HBFAMS	J1135	22	12A	FO1802	*J1134	22	12A	FO1802				
HBFANA	*J1142	01	02B	FO1802	J1134	24	13A	FO1802				
HBFAPOV	J1126	01	02B	FO1802	J1126	06	05A	FO1802	*J1141	13	06A	FO1802
	J1142	03	02A	FO1802	J1142	04	04A	FO1802				
HBFARA	*J1126	19	09B	FO1802	J1141	11	07A	FO1802				
HBFASA	J1142	20	11A	FO1802	*J1126	04	04A	FO1802				
HBFATR	*J1135	15	07B	FO1802	J1134	05	03B	FO1802	J1126	08	06A	FO1802
HBFATS	J1135	09	04B	FO1802	*J1134	01	02B	FO1802				
HBFAUA	*J1142	09	04B	FO1802	J1134	04	04A	FO1802				
HBFAWAV	*J1116	07	04B	FO1802	J1106	75	37B	FO1700				
HBFAWO	*J1135	55	29B	FO1802	J1116	09	05B	FO1802				
HBFAXAV	*J1116	80	38B	FO1802	J1145	75		FO1802				
HBFA12E	*J1110	13	07A	FO1802	J1109	06	05A	FO1802				
HBFA13E	J1140	46	21A	FO1801	J1141	22	14A	FO1802	*J1110	10	05A	FO1802
HBFBCAV	*J1141	14	08B	FO2200	J1126	70	33A	FO0200	J1125	49	24B	FO0400
	J1115	66	32B	FO0400	J1105	64	30A	FO0901	J1103	79	39B	FO1402
HBFBDAV	J1142	23	11B	FO2200	*J1133	43	24B	FO2200	J1115	35	16B	FO1300
	J1113	49	26B	FO1300	J1108	49	24B	FO1300	J1108	35	16B	FO1300
HBFBEO	J1141	65	33B	FO1801	J1141	79	39B	FO1801	J1147	11		FO2200
	J1141	17	09B	FO2200	J1141	27	13B	FO2200	J1137	54	25A	FO2200
	J1133	45	25B	FO2200	*J1106	59	31B	FO2200	J1107	17	08B	FO1801

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBFBFR	*J1142	21	10B	FO2200	J1134	03	02A	FO2200	J1106	66	31A	FO2200
	J1107	41	22B	FO1700								
HBFBFS	J1142	19	09B	FO2200	*J1134	09	04B	FO2200	J1107	29	14B	FO1801
HBFBGR	J1134	29	14B	FO2200	*J1142	38	18A	FO2200				
HBFBGS	J1140	30	15A	FO2200	J1142	42	20A	FO2200	*J1134	33	16B	FO2200
HBFBHR	J1134	50	23A	FO1801	J1134	35	17B	FO2200	*J1142	30	15A	FO2200
HBFBHS	J1142	36	17A	FO2200	*J1134	39	19B	FO2200				
HBFBIR	J1134	54	25A	FO2200	*J1142	33	16B	FO2200				
HBFBIS	J1142	31	15B	FO2200	J1140	26	14A	FO2200	*J1134	52	24A	FO2200
HBFBJA	*J1142	39	19B	FO2200	J1141	38	20A	FO2200				
HBFBJOV	*J1141	40	19A	FO2200	J1140	22	12A	FO2200				
HBFBKAV	*J1141	26	12B	FO2200	J1135	08	06A	FO1802	J1134	25	12B	FO1802
	J1134	17	08B	FO1802	J1135	13	06B	FO1802	J1135	18	10A	FO1900
	J1135	26	14A	FO1802	J1125	66	32B	FO1402	J1108	66	32B	FO1402
HBFBRD1	J1146	73		FO2200	*J1137	52	24A	FO2200	J1136	36		FO2200
HBFB1P	*J1140	23	11B	FO2200	J1135	69	35A	FO0200	J1135	79	39B	FO1700
HBFRAA	*J1128	63	33B	FO2200	J1117	59	31B	FO2200				
HBFRBAV	*J1116	70	34B	FO2200	J1117	61	32B	FO2200				
HBFRSAV	*J1141	42	18B	FO2200	J1140	36	17A	FO2200				
HBFRSO	*J1142	27	13B	FO2200	J1141	39	198	FO2200				
HBFR2O	*J1117	57	30B	FO2200	J1128	59	31B	FO2200				
HBFR8O	*J1132	59	31B	FO2200	J1116	69	35B	FO2200				
HBFSSO	*J1117	63	33B	FO2200	J1106	70	33A	FO2200				
HBFVSD1	J1146	77		FO1802	*J1137	63	33B	FO1802	J1136	05		FO1802
HBGN1OV	*J1141	37	17A	FO2300	J1108	05	03B	FO1600	J1110	03	03B	FO1802
	J1110	17	09B	FO1401	J1110	31	15B	FO1401	J1110	43	23B	FO0902
	J1110	55	29B	FO0902	J1108	71	33B	FO1402	J1105	62	29A	FO0901
HBGN2OV	*J1141	34	15A	FO2300	J1110	01	02B	FO1802	J1110	15	08B	FO1401
	J1108	21	10B	FO1600	J1110	29	14B	F01401	J1110	41	22B	FO0902
	J1110	53	28B	FO0902								
HBGN3OV	J1110	04	02A	FO1802	J1110	18	09A	FO1401	J1110	30	15A	FO1401
	J1110	46	21A	FO0902	J1110	57	28A	FO0902	J1108	77	36B	FO1402
	J1115	75	35B	FO1400	J1125	75	35B	FO1402	*J1141	30	14B	FO2300
HBGN4OV	*J1141	31	16B	FO2300	J1115	77	36B	FO0400	J1110	60	29A	FO0902
	J1110	48	22A	FO0902	J1110	34	16A	FO1401	J1110	20	10A	FO1401
	J1110	06	03A	FO1802								

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBHAAER	J1127	09	05B	FO0800	*J1114	05	04B	FO0800				
HBHAAOV	J1132	43	23B	FO0800	*J1127	07	04B	FO0800				
HBHABER	J1127	15	07B	FO0800	*J1114	11	07B	FO0800				
HBHABOV	J1132	46	21A	FO0800	*J1127	10	06B	FO0800				
HBHACER	J1127	22	14A	FO0800	*J1114	13	07A	FO0800				
HBHACOV	J1132	48	22A	FO0800	*J1127	24	13A	FO0800				
HBHADER	J1127	23	12A	FO0800	*J1114	08	04A	FO0800				
HBHADOV	J1132	49	26B	FO0800	*J1127	25	11A	FO0800				
HBHAEER	J1127	20	10A	FO0800	*J1114	19	10B	FO0800				
HBHAEOV	J1132	50	23A	FO0800	*J1127	18	09A	FO0800				
HBHAFER	J1127	17	09B	FO0800	*J1114	27	13B	FO0800				
HBHAFOV	J1132	52	24A	FO0800	*J1127	14	08B	FO0800				
HBHAGA	J1134	47	25B	FO0800	*J1132	47	25B	FO0800				
HBHAHR	J1134	49	26B	FO0800	*J1128	46	21A	FO0800				
HBHAHS	J1128	41	22B	FO0800	J1128	48	22A	FO0800	*J1134	51	27B	FO0800
	J1147	13		FO0800								
HBHAIA	*J1128	45	24B	FO0800	J1127	52	26A	FO0800	J1103	78	38A	FO0400
HBHAIOV	J1147	09		FO0800	*J1127	54	25A	FO0800				
HBHB11V1	J1114	01	02B	FO0800	*J1131	15	T01	FO0800	J1136	35		FO0800
HBHB12V1	J1114	07	05B	FO0800	*J1131	18	T02	FO0800	J1136	37		FO0800
HBHB13V1	J1114	10	05A	FO0800	*J1131	20	T03	FO0800	J1136	39		FO0800
HBHB14V1	J1114	04	02A	FO0800	*J1131	22	T04	FQ0800	J1136	40		FO0800
HBHB15V1	J1114	15	08B	FO0800	*J1131	24	T05	FO0800	J1136	42		FO0800
HBHB16V1	J1114	21	11B	FO0800	*J1131	26	T06	FO0800	J1136	46		FO0800
HBHB17V1	*J1131	29	T07	FO0800	J1136	41		FO0800				
HBHB18V1	*J1131	34	T08	FO0800	J1136	45		FO0800				
HBINHAV	*J1112	40	19A	FO1300	J1109	52	24A	FO1300				
HBJAAO	J1133	11	07A	FO1700	*J1132	11	05B	FO1700				
HBJABO	J1133	06	05A	FO1700	*J1132	23	11B	FO1700				
HBJACAV	J1106	01	02B	FO1700	*J1133	13	06A	FO1700				
HBJACO	J1128	62	29A	FO1700	*J1126	51	27B	FO1700				
HBJADAV	J1106	04	04A	FO1700	*J1133	08	04A	FO1700				
HBJAFO	*J1106	09	04B	FO1700	J1133	55	29B	FO1700	J1140	01	02B	FO0901
HBJAGAV	J1134	41	22B	FO1700	*J1133	56	28V	FO1700	J1126	60	28A	FO0200
HBJAHR	J1134	74	35B	FO1700	J1134	43	23B	FO1700	*J1135	51	27B	FO1700
HBJAHS	J1142	65	34B	FO1700	*J1134	45	24B	FO1700	J1135	47	25B	FO1700

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBJAIO	J1141	73	37B	FO1700	*J1135	73	36B	FO1700				
HBJAJAV	J1130	36	17A	FO1700	J1134	71	36A	FO1700	*J1141	71	36B	FO1700
HBJAKQ	J1142	74	35B	FO1700	J1141	69	35B	FO1700	J1137	68	32A	FO1700
	J1134	73	36B	FO1700	J1134	65	34B	FO1700	*J1130	31	15B	FO1700
HBJALOV	*J1141	70	34B	FO1700	J1130	34	16A	FO1700				
HBJAMO	J1137	41	22B	FO1700	J1137	48	22A	FO1700	*J1134	69	35A	FO1700
HBJANO	*J1142	69	35A	FO1700	J1137	62	29A	FO1700	J1137	47	25B	FO1700
HBJAPD1	J1118	75			*J1137	46	21A	FO1700	J1141	21	11B	FO1700
HBJAPOV	*J1141	19	10B	FO1700	J1145	58		FO1700				
HBJAQD6	*J1137	45	24B	FO1700	J1138	20		FO2300	J1138	20		FO2400
	J1138	08		FO2300	J1138	08		FO2400	J1145	60		FO1700
HBJARD1	*J1137	51	27B	FO1700	J1127	45	25B	FO1700	J1118	76		FO1700
HBJAROV	*J1127	43	24B	FO1700	J1145	69		FO1700				
HBJASD6	*J1137	60	28A	FO1700	J1138	26		FO2300	J1138	26		FO2400
	J1138	10		FO2300	J1138	10		FO2400	J1145	61		FO1700
HBJBAO	*J1106	76	37A	FO1700	J1128	42	20A	FO1700				
HBJBBA	*J1128	38	18A	FO1700	J1106	07	03A	FO1700				
HBJBCA	*J1128	60	28A	FO1700	J1106	05	03B	FO1700				
HBJBDAV	*J1141	08	04A	FO1700	J1135	49	26B	FO1700	J1135	77	38B	FO1700
HBJBDO	*J1107	43	23B	FO1700	J1141	06	05A	FO1700				
HBJPSA	*J1134	72	34A	FO1700	J1128	54	25A	FO1700				
HBJPWAV	*J1141	54	25A	FO1700	J1130	29	14B	FO1700				
HBJPWO	*J1128	52	24A	FO1700	J1141	52	26A	FO1700				
HBJRCD6	*J1137	66	31A	FO1700	J1138	35		FO2300	J1138	35		FO2400
	J1138	23		FO2300	J1138	23		FO2400	J1145	64		FO1700
HBJ00OV	J1146	09		FO0300	*J1133	26	12B	FO0300				
HBJ01OV	J1146	10		FO0300	*J1133	72	34A	FO0300				
HBJ02OV	J1146	11		FO0300	*J1133	34	15A	FO0300				
HBJ03OV	J1146	13		FO0300	*J1133	77	38A	FO0300				
HBJ04O0V	J1146	14		FO0300	*J1133	31	16B	FO0300				
HBJ05OV	J1146	15		FO0300	*J1127	08	04A	FO0300				
HBJ06OV	J1146	17		FO0300	*J1133	68	32B	FO0300				
HBJ07OV	J1146	18		FO0300	*J1127	01	02B	FO0300				
HBJ08OV	J1146	19		FO0300	*J1133	71	36B	FO0300				
HBKAAAV	J1130	08	06A	FO1803	*J1116	03	03A	FO1803				
HBKABAV	J1130	06	05A	FO1803	*J1116	01	02B	FO1803				

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup - Continued

Signal	Distribution											
HBKADA	*J1135	27	13B	FO1803	J1133	22	14A	FO1803				
HBKAEA	*J1135	31	15B	FO1803	J1133	38	20A	FO1803	J1107	05	03B	FO1801
HBKAFOV	J1135	40	19A	FO1803	*J1133	24	13A	FO1803	J1107	01	02B	FO1801
HBKAGOV	J1135	33	16B	FO1803	*J1133	40	19A	FO1803				
HBKAHA	J1130	56	26A	FO1801	*J1135	36	17A	FO1803				
HBKAJA	*J1135	39	19B	FO1803	J1130	46	21A	FO1801				
HBKAKA	*J1135	50	23A	FO1803	J1130	70	33A	FO1801				
HBKALA	J1130	60	28A	FO1801	*J1126	50	23A	FO1803				
HBKAMD	*J1137	30	15A	FO1803	J1145	07		FO1803				
HBKANOV	J1146	75		FO1803	*J1141	72	34A	FO1803				
HBKAPOV	J1146	76		FO1803	*J1141	01	02B	FO1803				
HBKAQR	*J1135	43	23B	FO1803	J1134	42	20A	FO1803	J1137	11	05B	FO1803
	J1137	03	02A	FO1803	J1137	04	04A	FO1803				
HBKAQS	J1135	41	22B	FO1803	*J1134	38	18A	FO1803				
HBKARD	J1136	73		FO1803	*J1137	01	02B	FO1803	J1145	08		FO1803
HBKASD	J1118	72		FO1803	*J1137	09	04B	FO1803	J1145	09		FO1803
HBKATD	J1116	73		FO1803	*J1137	15	07B	FO1803	J1145	10		FO1803
HBKAUD1	*J1137	38	18A	FO1803	J1136	10		FO1803				
HBKA10T	J1133	27	13B	FO0300	J1133	21	11B	FO0300	*J1125	08	04A	FO0300
HBKA11T	J1133	74	35A	FO0300	J1133	69	35B	FO0300	*J1125	10	05A	FO0300
HBKA12T	J1133	36	16A	FO0300	J1133	35	18A	FO0300	*J1125	14	06A	FO0300
HBKA13T	J1133	76	37A	FO0300	J1133	75	39A	FO0300	*J1125	13	07A	FO0300
HBKA14T	J1133	33	17B	FO0300	J1133	29	15B	FO0300	*J1125	17	08B	FO0300
HBKA15T	J1127	06	05A	FO0300	J1127	11	07A	FO0300	*J1125	07	04B	FO0300
HBKA16T	J1133	65	33B	FO0300	J1133	39	19B	FO0300	*J1125	09	05B	FO0300
HBKA17T	J1127	04	02A	FO0300	J1127	05	03B	FO0300	*J1125	11	06B	FO0300
HBKA18T	J1133	79	39B	FO0300	J1133	73	37B	FO0300	*J1125	15	07B	FO0300
HBKB11V1	J1125	04	02A	FO0300	*J1131	62	T17	FO0300	J1136	64		FO0300
HBKB12V1	J1125	06	03A	FO0300	*J1131	64	T18	FO0300	J1136	61		FO0300
HBKB13V1	J1125	03	02B	FO0300	*J1131	66	T19	FO0300	J1136	63		FO0300
HBKB14V1	J1125	05	03B	FO0300	*J1131	68	T21	FO0300	J1136	65		FO0300
HBKB15V1	*J1131	70	T20	FO0300	J1136	66		FO0300	J1147	15		FO0300
HBKB16V1	*J1131	72	T22	FO0300	J1136	72		FO0300	J1147	17		FO0300
HBKB17V1	*J1131	74	T23	FO0300	J1136	74		FO0300	J1147	18		FO0300
HBKB18V1	*J1131	76	T24	FO0300	J1136	71		FO0300	J1147	19		FO0300
HBKC1Q	J1140	08	06A	FO2200	*J1130	13	06B	FO1803	J1131	45		FO0200

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	J1133	47		FO0200	J1106	61	32B	FO2200				
HBKC2Q	*J1140	13	06B	FO1803	J1130	05	03B	FO1803	J1107	46	21A	FO1700
HBKC3AV	J1116	19	10B	FO1803	J1130	77	38B	FO1801				
HBKC3Q	J1116	21	11B	FO1803	J1140	56	26A	FO1801	J1130	07	03A	FO1803
	J1107	09	04B	FO1801	J1106	74	35B	FO1801	J1107	14	09A	FO1801
HBK00OV	*J1133	19	10B	FO0300	J1124	21		FO1202	J1124	23		FO1202
	J1121	23		FO1202	J1121	21		FO1202				
HBK01OV	*J1133	70	34B	FO0300	J1124	47		FO1201	J1124	45		FO1201
	J1121	45		FO1201	J1121	47		FO1201				
HBK02OV	*J1133	37	17A	FO0300	J1124	63		FO1201	J1124	65		FO1201
	J1121	65		FO1201	J1121	63		FO1201				
HBK03OV	*J1133	78	36A	FO0300	J1123	23		FO1201	J1123	21		FO1201
	J1120	21		FO1201	J1120	23		FO1201				
HBK04OV	*J1133	30	14B	FO0300	J1123	45		FO1203	J1123	47		FO1203
	J1120	45		FO1203								
HBK05OV	*J1127	13	06A	FO0300	J1123	63		FO1203	J1123	65		FO1203
	J1120	65		FO1203	J1120	63		FO1203				
HBK06OV	*J1133	42	18B	FO0300	J1122	23		FO1203	J1122	21		FO1203
	J1119	21		FO1203	J1119	23		FO1203				
HBK07OV	*J1127	03	03A	FO0300	J1122	45		FO1203	J1122	47		FO1203
	J1119	47		FO1203	J1119	45		FO1203				
HBK08OV	*J1133	80	38B	FO0300	J1122	65		FO1203	J1122	63		FO1203
	J1119	63		FO1203	J1119	65		FO1203	J1109	17	08B	FO0400
HBLABA	J1113	62	29A	FO1300	*J1103	51	27B	FO1300				
HBLACO	J1115	37	17B	FO1300	J1113	60	28A	FO1300	J1108	51	25B	FO1300
	J1108	37	17B	FO1300								
HBLADA	J1113	64	30A	FO1300	*J1109	64	30A	FO1300				
HBLAEA	J1112	35	18A	FO1300	*J1106	47	25B	FO1300	J1103	54	25A	FO1300
HBLAEOV	*J1112	37	17A	FO1300	J1103	48	22A	FO1300				
HBLAFO	J1147	60		FO1300	J1145	43		FO1300	J1109	56	26A	FO1300
	*J1103	52	24A	FO1300	J1132	56	26A	FO0800				
HBLAGA	J1146	69		FO1300	J1109	50	23A	FO1300				

*Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution											
HBLAHA	J1113	47	25B	FO1300	*J1103	46	21A	FO1300				
HBLAIAV	J1112	34	15A	FO1300	J1105	52	24A	FO1300				
HBLAIO	*J1113	51	27B	FO1300	J1112	36	16A	FO1300				
HBLAJOV	*J1112	30	14B	FO1300	J1109	47	25B	FO1300				
HBLAKP	*J1105	47	25B	FO1300	J1104	64	33A	FO1300	J1109	66	31A	FO1300
	J1109	57	30B	FO0400								
HBLAKQ	J1103	49	26B	FO1300	*J1105	49	26B	FO1300	J1108	63	31A	FO1300
	J1108	50	24A	FO1300	J1115	50	24A	FO1300				
HBLAKOV	*J1104	66	32A	FO1300	J1103	56	26A	FO1300	J1106	56	26A	FO1300
	J1145	42		FO1300								
HBLAMA	*J1109	43	23B	FO1300	J1117	05	03B	FO1507	J1117	13	06B	FO1507
	J1117	19	09B	FO1507	J1117	20	11A	FO1507	J1117	26	14A	FO1507
	J1117	25	12B	FO1507	J1117	31	15B	FO1507	J1117	36	17A	FO1507
	J1117	37	18B	FO1507								
HBLA15U	J1115	47	23A	FO1300	*J1108	36	17A	FO1300	J1106	49	26B	FO1300
	J1112	47	24A	FO1300								
HBLA25U	J1108	64	30A	FO1300	J1106	52	24A	FO1300	*J1115	36	17A	FO1300
HBLA35U	*J1108	52	25A	FO1300	J1106	54	25A	FO1300				
HBLDCO	J1147	42		FO1300	*J1113	80	39A	FO1300				
HBLFTA6	J1139	05		FO2300	J1145	80		FO2401				
HBLHLA	*J1109	51	27B	FO1300	J1112	33	17B	FO1300				
HBLHLOV	*J1112	31	16B	FO1300	J1117	42	20A	FO1507	J1117	10	07A	FO1300
	J1117	07	03A	FO1507	J1117	41	22B	FO1507	J1142	11	05B	FO1507
	J1142	59	31B	FO1507	J1134	78	38A	FO1507				
HBLNAAV	*J1112	49	23A	FO1300	J1104	41	23B	FO1300				
HBLNAOV	*J1104	46	22B	FO1300	J1108	61	31B	FO1300				
HBMWCOV	*J1116	14	08B	FO0400	J1109	18	10A	FO0400				
HBMWC3T	J1115	30	15A	FO0400	*J1116	17	09B	FO0400				
HBMXCOV	*J1116	10	06B	FO0400	J1109	14	09A	FO0400				
HBMXC4T	*J1115	17	08B	FO0400	J1116	15	07B	FO0400				
HBMXWA	*J1109	19	09B	FO0400	J1108	57	29B	FO1300				
HBMYA1V1	J1125	53	26B	FO0400	J1118	38		FO0400	*J1111	62	T17	FO0400
HBMYA2V1	J1125	55	27B	FO0400	J1118	36		FO0400	*J1111	64	T18	FO0400
HBYMA3V1	J1125	57	29B	FO0400	J1118	35		FO0400	*J1111	66	T19	FO0400
HBMYA4V1	J1125	59	30B	FO0400	J1118	37		FO0400	*J1111	68	T21	FO0400
HBMYA5V1	*J1111	70	T20	FO0400	J1115	71	33B	FO0400	J1118	39		FO0400
HBMYA6V1	*J1111	72	T22	FO0400	J1115	73	34B	FO0400	J1118	40		FO0400

*Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution										
HBMYA7V1	*J1111	74	T23	FO0400	J1118	42		FO0400				
HBMYA8V1	*J1111	76	T24	FO0400	J1118	46		FO0400				
HBMYB1O	J1115	04	02A	FO0400	J1114	03	03B	FO0800	J1112	64	33A	FO0400
	*J1125	54	26A	FO0400								
HBMYB2U	J1115	06	03A	FO0400	J1114	09	06B	FO0800	J1112	61	31A	FO0400
	*J1125	56	28B	FO0400								
HBMYB3U	J1115	03	02B	FO0400	J1114	14	06A	FO0800	J1112	62	29A	FO0400
	*J1125	60	28A	FO0400								
HBMYB4U	J1115	20	10A	FO0400	J1114	06	03A	FO0800	J1112	55	29B	FO0400
	*J1125	62	29A	FO0400								
HBMYBSO	*J1125	52	25A	FO0400	J1115	79	37B	FO0400				
HBMYC1U	*J1115	70	34A	FO0400	J1112	59	31B	FO0400	J1114	17	09B	FO0800
	J1103	41	22B	FO0400								
HBMYC2U	*J1115	72	35A	FO0400	J1112	65	33B	FO0400	J1114	23	12B	FO0800
	J1117	48	22A	FO0400								
HBMYLA	J1125	63	31A	FO0400	J1115	80	38B	FO0400	*J1113	69	35A	FO0400
HBMYRAV	J1105	75	37B	FO0400	*J1104	77	38A	FO0400				
HBMYRO	J1104	75	39A	FO0400	*J1103	80	39A	FO0400				
HBMYTP	J1113	65	34B	FO0400	J1109	62	29A	FO0400	*J1105	76	37A	FO0400
HBMYTQ	J1109	61	32B	FO0400	*J1105	78	38A	FO0400				
HBMY1AV	J1146	20		FO0400	J1116	38	20A	FO0400	J1116	35	18A	FO0400
	*J1112	66	32A	FO0400								
HBMY2AV	J1146	21		FO0400	J1116	29	15B	FO0400	J1116	36	16A	FO0400
	*J1112	63	30A	FO0400								
HBMY3AV	J1146	32		FO0400	J1116	33	17B	FO0400	J1116	39	19B	FO0400
	*J1112	60	28A	FO0400								
HBMY4AV	J1146	23		FO0400	J1116	47	24A	FO0400	J1116	52	26A	FO0400
	*J1112	56	28B	FO0400								
HBMYSAV	J1146	24		FO0400	J1116	41	23B	FO0400	J1116	50	22A	FO0400
	*J1112	57	30B	FO0400								
HBMY6AV	J1146	25		FO0400	J1116	45	25B	FO0400	J1116	51	27B	FO0400
	*J1112	68	32B	FO0400								
HBNBCA	*J1117	45	24B	FO1507	J1147	45		FO1507				
HBNY1A	*J1103	45	24B	FO0400	J1116	22	14A	FO0400				
HBNY1OV	*J1116	24	13A	FO0400	J1115	22	11A					
HBNY2A	*J1117	46	21A	FO0400	J1116	23	12A	FO0400				

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HBNY2OV	*J1116	25	11A	FO0400	J1116	19	09B	FO0400				
HBPPNR	J1146	72		FO1900	*J1135	19	09B	FO1900	J1134	20	11A	FO1900
HBPPNS	J1135	14	09A	FO1900	*J1134	14	09A	FO1900				
HBRCYP	*J1140	33	16B	FO2200	J1135	75	37B	FO1200	J1135	45	24B	FO1200
	J1134	48	22A	FO1801								
HBRM10V	J1140	38	18A	FO1202	J1147	08		FO1402	J1131	21		FO0800
	J1131	23		FO0800	J1131	65		FO0300	J1131	63		FO0300
	*J1104	54	25A	FO1402								
HBRM30V	J1105	77	38B	FO0400	*J1104	49	23A	FO1402	J1109	53	28B	FO0400
	J1111	47		FO1402	J1145			FO1402	J1111	63		FO0400
	J1111	65		FO0400	J1113	74	35B	FO0400	J1130	71	36A	FO1402
HBRSAAV	J1134	64	30A	FO1801	J1134	70	33A	FO1801	*J1141	68	32B	FO1801
	J1142	49	26B	FO1801	J1142	50	23A	FO1801	J1142	43	23B	FO1801
	J1142	10	07A	FO0901								
HBRSBAV	*J1141	80	38B	FO1801	J1142	70	33A	FO1801	J1134	55	29B	FO1801
	J1134	61	32B	FO1801	J1126	48	22A	FO0100				
HBRSCAV	*J1141	77	38A	FO0901	J1140	04	04A	FO0901				
HBRSCO	*J1142	06	05A	FO0901	J1141	75	39A	FO0901				
HBRS0AV	*J1141	57	30B	FO1801	J1140	75	37B	FO1801				
HBRS0O	*J1107	27	13B	FO1801	J1141	59	31B	FO1801				
HBRS2AV	*J1141	66	32A	FO1801	J1140	52	24A	FO1801				
HBRS2O	*J1142	46	21A	FO1801	J1141	64	33A	FO1801				
HBRS3AV	*J1133	53	26B	FO1801	J1130	52	24A	FO1801				
HBRS3O	*J1134	66	31A	FO1801	J1133	51	27B	FO1801				
HBRS4AV	*J1141	63	30A	FO1801	J1140	50	23A	FO1801				
HBRS4O	*J1142	45	24B	FO1801	J1141	61	31A	FO1801				
HBRS5AV	*J1133	66	32A	FO1801	J1130	50	23A	FO1801				
HBRS5O	*J1134	60	28A	FO1801	J1133	64	33A	FO1801				
HBRS6AV	*J1141	60	28A	FO1801	J1140	66	31A	FO1801				
HBRS6O	*J1142	51	27B	FO1801	J1141	62	29A	FO1801				
HBRS7AV	*J1133	63	30A	FO1801	J1130	66	31A	FO1801				
HBRS7O	*J1134	57	30B	FO1801	J1133	61	31A	FO1801				
HBRS8AV	*J1141	56B	28B	FO1801	J1140	64	30A	FO1801				
HBRS8O	*J1142	66	31A	FO1801	J1141	55	29B	FO1801				
HBRS9AV	*J1133	60	28A	FO1801	J1130	64	30A	FO1801				
HBRS9O	*J1134	63	33B	FO1801	J1133	62	29A	FO1801				

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution										
HBSAAAV	J1132	71	36A	FO1402	*J1127	71	36B	FO1402				
HBSABAV	J1132	72	34A	FO1402	*J1127	70	34B	FO1402				
HBSACAV	J1132	73	36B	FO1402	*J1127	72	34A	FO1402				
HBSADAV	J1132	74	35B	FO1402	*J1127	78	36A	FO1402				
HBSAEAV	J1132	75	37B	FO1402	*J1127	77	38A	FO1402				
HBSAFAV	J1132	77	38B	FO1402	*J1112	72	34A	FO1402				
HBSAGAV	J1132	78	38A	FO1402	*J1112	78	36A	FO1402				
HBSAHAV	J1132	79	39B	FO1402	*J1112	77	38A	FO1402				
HBSAIO	J1135	70	33A	FO1402	*J1132	76	37A	FO1402				
HBSAJA	*J1135	64	30A	FO1402	J1132	24	13A	FO1700	J1128	56	26A	FO1700
HBSAKAV	J1147	23		FO1402	*J1112	43	24B	FO1402	J1104	47	24A	FO1402
	J1104	52	26A	FO1402								
HBSALA	J1104	61	31A	FO1402	*J1103	60	28A	FO1402				
HBSA1P	*J1130	69	35A	FO1402	J1110	66	32A	FO902	J1110	54	25A	FO902
HBSA1Q	*J1130	74	35B	FO1402	J1110	50	23A	FO0902	J1110	62	30A	FO0902
	J1105	68	32A	FO1402	J1103	62	29A	FO1402				
HBSA2P	*J1105	59	31B	FO1402	J1103	64	30A	FO1402				
HBSB1A	*J1107	07	03A	FO1801	J1134	34	16A	FO1801				
HBSB2O	J1107	11	05B	FO1801	*J1134	30	15A	FO1801				
HBSB3A	*J1107	15	07B	FO1801	J1140	51	27B	FO1801				
HBSB4O	*J1107	20	11A	FO1801	J1130	48	22A	FO1801	J1135	37	18B	FO1803
HBSB5A	*J1106	69	35A	FO1801	J1107	24	13A	FO1801				
HBSB6A	*J1107	19	09B	FO1801	J1140	80	39A	FO1801				
HBSB7A	*J1107	31	15B	FO1801	J1128	79	39B	FO1801				
HBSB8O	*J1107	36	17A	FO1801	J1126	25	12B	FO1802				■
HBSB9A	*J1107	74	35B	FO1801	J1130	80	39A	FO1801				
HBSB9O	J1107	71	36A	FO1801	*J1128	75	27B	FO1801				
HBSCTO	*J1126	39	19B	FO1802	J1106	22	12A	FO1802	J1106	19	09B	FO1802
HBSSIA	*J1106	21	10B	FO1802	J1113	68	32A	FO0100				
HBSSTO	*J1126	36	17A	FO1802	J1106	14	09A	FO1802				
HBSTCP	*J1140	09	04B	FO0901	J1109	05	03B	FO0901	J1105	36	17A	FO0901
HBST0P	J1126	46	21A	FO0100	*J1140	76	37A	FO1801	J1141	51	27B	FO1801
	J1134	59	31B	FO1801	J1132	70	33A	FO2200				
HBST0Q	J1130	30	15A	FO1700	*J1140	78	38A	FO1801	J1107	13	06B	FO1801
	J1106	71	36A	FO1801	J1107	38	18A	FO1801				
HBST0OV	*J1141	53	26B	FO1801	J1145	22		FO1801				

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HBST1AV	J1127	39	19B	FO1801	J1117	53	28B	FO2200	*J1116	26	12B	FO1801
	J1107	23	11B	FO1801	J1107	54	25A	FO1600				
■ HBST1P	J1137	64	30A	FO1700	J1137	50	23A	FO1700	J1137	49	26B	FO1700
	J1137	43	23B	FO1700	*J1130	76	37A	FO1801				
HBST1Q	J1140	54	25A	FO1801	*J1130	78	38A	FO0801	J1107	69	35A	FO0100
	J1116	27	13B	FO1801								
HBST1OV	*J1127	42	18B	FO1801	J1145	17		FO1801				
HBST2P	J1141	47	24A	FO1801	*J1140	47	25B	FO1801	J1130	75	37B	FO1801
	J1117	55	29B	FO2200	J1107	25	12B	FO1801	J1107	08	06A	FO0100
HBST2Q	J1135	38	18A	FO1803	*J1140	49	26B	FO1801	J1130	54	25A	FO1801
HBST2OV	*J1141	49	23A	FO1801	J1145	18		FO1801				
HBST3P	J1132	55	29B	FO2200	J1142	48	22A	FO1801	J1133	52	26A	FO1801
	*J1130	47	25B	FO1801	J1112	50	22A	FO1802	J1110	14	06A	FO1802
	J1109	75	37B	FO1401								
HBST3Q	J1140	48	22A	FO1801	*J1130	49	26B	FO1801	J1110	05	04B	FO1802
HBST3OV	*J1133	54	25A	FO1801	J1145	11		FO1801				
■ HBST4P	J1107	22	12A	FO1801	J1132	60	12A	FO2200	J1134	68	32A	FO1801
	*J1135	46	21A	FO1803	*J1140	45	24B	FO1801	J1141	50	22A	FO1801
HBST4OV	*J1141	48	21A	FO1801	J1145	19	21A	FO1801				
HBST5P	J1142	25	12B	FO2200	J1142	41	22B	FO1801	J1126	21	10B	FO1802
	J1134	08	06A	FO1802	J1133	47	24A	FO1801	*J1130	45	24B	FO1801
	J1132	61	32B	FO2200	J1107	21	10B	FO1801	J1107	06	05A	FO0100
HBST5Q	J1140	68	32A	FO1801	*J1130	43	23B	FO1801	J1107	35	17B	FO1600
HBST5OV	*J1133	49	23A	FO1801	J1145	15	23A	FO1801				
■ HBST6P	J1141	41	23B	FO1801	*J1140	59	31B	FO1801	J1134	62	29A	FO1801
	J1134	18	10A	FO1900	J1132	62	29A	FO2200				
HBST6Q	*J1140	61	32B	FO1801	J1135	54	25A	FO1803				
HBST6OV	J1141	46	22B	FO1801	J1145	20	22B	FO1801				
HBST7P	J1142	47	25B	FO1801	J1133	50	22A	FO1801	*J1130	59	31B	FO1801
	J1132	64	30A	FO2200	J1127	38	20A	FO0200				
HBST7Q	J1140	62	29A	FO1801	*J1130	61	32B	FO1801	J1112	45	25B	FO1402
	J1103	76	37A	FO0400	J1106	10	07A	FO1401				
HBST7OV	*J1133	48	21A	FO1801	J1145	13		FO1801				
HBST8P	J1141	45	25B	FO1801	*J1140	57	30B	FO1801	J1134	53	38B	FO1801
	J1135	17	08B	FO1900	J1132	66	31A	FO2200				

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution										
HBST8Q	*J1140	55	28B	FO1801	J1126	54	25A	FO1803			
HBST8OV	*J1141	43	24B	FO1801	J1145	21		FO1801			
HBST9P	J1142	68	32A	FO1801	J1126	23	11B	FO1802	J1135	10 07A	FO1802
	J1133	41	23B	FO1801	*J1130	57	30B	FO1801	J1132	68 32A	FO2200
	J1107	52	24A	FO1600							
HBST9Q	J1140	77	38B	FO1801	*J1130	55	29B	FO1801			
HBST9OV	*J1133	46	22B	FO1801	J1145	14		FO1801			
HBSUIA	J1106	23	11B	FO1802	J1107	78	38A	FO0100			
HBS2AO	J1106	72	34A	FO1801	J1128	71	36A	FO1801	*J1134	46 21A	FO1801
HBS2BA	*J1128	72	34A	FO1801	J1134	36	17A	FO1801			
HBS8BA	*J1142	72	34A	FO1801	J1134	79	39B	FO1801			
HBS8CO	J1140	60	28A	FO1801	*J1134	75	37B	FO1801			
HBTCPO	*J1109	73	36B	FO1401	J1110	37	18B	FO1401	J1110	23 12B	FO1401
HBTCSD1	J1126	35	17B	FO1802	J1142	55	29B	FO1802	J1136	06	FO1802
	*J1137	80	39A	FO1802							
HBTDEA	*J1106	11	05B	FO1401	J1109	77	38B	FO1401			
HBTD1OE	*J1110	47	28B	FO0902	J1104	09	05B	FO0902	J1103	10 07A	FO0902
	J1103	04	04A	FO0902							
HBTD11E	J1110	51	27B	FO0902	J1104	15	07B	FO0902			
HBTD12E	*J1110	56	26A	FO0902	J1104	22	14A	FO0902	J1103	03 02A	FO0902
HBTD13E	*J1110	52	24A	FO0902	J1104	23	12A	FO0902	J1103	13 06B	FO0902
HBTD20E	J1117	71	36A	FO0902	*J1110	61	31B	FO0902	J1104	20 10A	FO0902
HBTD21E	J1126	18	10A	FO1802	*J1110	65	33B	FO0902	J1104	17 09B	FO0902
	J1103	20	11A	FO0902							
HBTD22E	*J1110	68	33A	FO0902	J1104	21	11B	FO0902	J1103	08 06A	FO0902
HBTD23E	*J1110	64	31A	FO0902	J1104	27	13B	FO0902	J1103	25 12B	FO0902
HBTEAER	J1127	73	37B	FO1402	*J1114	25	14A	FO1402			
HBTEBER	J1127	69	35B	FO1402	*J1114	22	11A	FO1402			
HBTECER	J1127	74	35A	FO1402	*J1114	33	16B	FO1402			
HBTEDER	J1127	76	37A	FO1402	*J1114	39	19B	FO1402			
HBTEEER	J1127	75	39A	FO1402	*J1114	42	20A	FO1402			
HBTEFER	*J1114	36	17A	FO1402	J1112	74	35A	FO1402			
HBTEGER	*J1114	45	24B	FO1402	J1112	76	37A	FO1402			
HBTEHER	*J1114	51	27B	FO1402	J1112	75	39A	FO1402			
HBTE1A	J1105	46	21A	FO1402	J1104	38	20A	FO0902	*J1103	06 05A	FO0902
HBTF1OV	J1109	48	22A	FO1300	J1109	49	26B	FO1300	*J1104	40 19A	FO0902

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HBTE2A	J1135	24	13A	FO1802	J1135	11	05B	FO1802	J1105	79	39B	FO0400
	J1104	35	18A	FO0902	*J1103	01	02B	FO0902				
HBTE2OV	J1109	60	28A	FO0400	*J1104	37	17A	FO0902				
HBTE3A	J1147	10		FO0902	*J1103	09	04B	FO0902	J1104	50	22A	FO1202
	J1110	77	38B	FO1202								
HBTE4A	*J1104	36	16A	FO0902	J1103	15	07B	FO0902				
HBTE4OV	*J1104	34	15A	FO0902	J1109	54	25A	FO1300	J1126	05	03B	FO1802
	J1126	10	07A	FO1802								
HBTE5A	J1128	50	23A	FO0800	J1104	29	15B	FO0902	*J1103	22	12A	FO0902
HBTE6A	J1104	33	17B	FO0902	*J1103	14	09A	FO0902				
HBTE6OV	J1132	54	25A	FO0800	*J1104	31	16B	FO0902	J1103	50	23A	FO1300
HBTE7A	J1103	59	31B	FO1402	J1103	53	28B	FO1402	J1104	51	27B	FO0902
	*J1105	56	26A	FO1300	J1117	72	34A	FO0902				
HBTE7OV	J1109	70	33A	FO1300	*J1104	53	26B	FO0902				
HBTEBA	J1104	79	39B	FO0901	J1105	60	28A	FO0901	*J1103	27	13B	FO0902
HBTE8OV	J1128	43	23B	FO0800	J1109	59	31B	FO0400	*J1104	80	38B	FO0902
	J1103	47	25B	FO1300								
HBTFAO	J1110	63	32B	FO0902	J1110	49	26B	FO0902	*J1106	45	24B	FO0901
HBTFBA	*J1109	15	07B	FO0901	J1106	43	23B	FO0901				
HBTFCA	*J1109	20	11A	FO0901	J1106	46	21A	FO0901				
HBTFEA	J1106	50	23A	FO0901	*J1103	69	35A	FO0901				
HBTFFAV	*J1112	26	12B	FO0901	J1109	26	14A	FO0901	J1109	13	06B	FO0901
HBTFFO	J1112	27	13B	FO0901	*J1109	07	03A	FO0901	J1105	53	28B	FO0901
	*J1103	72	34A	FO0901								
HBTFHA	J1142	08	06A	FO0901	*J1128	51	27B	FO0901	J1116	20	10A	FO0901
HBTFHOV	*J1116	18	09A	FO0901	J1103	71	36A	FO0901				
HBTFIOV	J1105	34	16A	FO0901	*J1104	71	36B	FO0901				
HBTFJOV	J1140	05	03B	FO0901	*J1104	72	34A	FO0901				
HBTFKOV	J1105	40	19A	FO0901	*J1104	42	18B	FO0901				
HBTFLOV	*J1104	78	36A	FO0901	J1103	73	36B	FO0901				
HBTRTO1	*J1102	30		FO0901	J1102	52		FO0901	J1118	71		FO0901
HBTT1AV	*J1104	07	04B	FO0902	J1103	24	13A	FO0902				
HBTT2AV	*J1104	10	06B	FO0902	J1103	05	03B	FO0902				
HBTT3AV	*J1104	24	13A	FO0902	J1103	11	05B	FO0902				
HBTT4AV	J1112	39	19B	FO0902	*J1104	25	11A	FO0902	J1103	07	03A	FO0902
HBTT40V	*J1112	42	18B	FO0902	J1110	59	30B	FO0902				

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HBTT5AV	*J1104	18	09A	FO0902	J1103	18	10A	FO0902				
HBTT6AV	J1117	73	36B	FO0902	*J1104	14	08B	FO0902				
HBTT7AV	*J1104	19	10B	FO0902	J1103	23	11B	FO0902				
HBTT8AV	J1110	45	24B	FO0902	*J1104	26	12B	FO0902	J1103	26	14A	FO0902
HBT1AOV	J1140	10	07A	FO1803	J1140	14	09A	FO0200	J1130	14	09A	FO0200
	J1130	01	02B	FO1803	*J1104	08	04A	FO0901				
HBT1COV	J1130	72	34A	FO1402	J1105	70	33A	FO1402	*J1104	01	02B	FO0901
HBT19AV	J1116	64	33A	FO1401	*J1112	53	26B	FO1401				
HBT19OE	J1145	30		FO1401	J1114	24	12A	FO1402	*J1110	21	11B	FO1401
HBT19OV	*J1116	66	32A	FO1401	J1110	33	16B	FO1401				
HBT191E	J1145	31		FO1401	J1114	18	09A	FO1402	*J1110	27	13B	FO1401
HBT192E	J1145	33		FO1401	J1114	29	14B	FO1402	*J1110	25	14A	FO1401
HBT193E	J1145	34		FO1401	J1114	35	17B	FO1402	J1112	51	27B	FO1401
	*J1110	24	12A	FO1401								
HBT20AV	*J1112	46	22B	FO1401	J1110	19	10B	FO1401				
HBT20OE	J1145	35		FO1401	J1114	38	18A	FO1402	*J110	35	17B	FO1401
HBT201E	J1145	36		FO1401	J1114	30	15A	FO1402	*J110	39	19B	FO1401
HBT202E	J1145	37		FO1401	J1114	41	22B	FO1402	*J110	42	20A	FO1401
HBT203E	J1145	38		FO1401	J1114	47	25B	FO1402	J1112	41	23B	FO1401
	*J1110	38	18A	FO1401								
HBT211V1	*J1111	38	T09	FO1402	J1114	26	13A	FO1402	J1118	41		FO1402
HBT212V1	J1114	20	10A	FO1402	*J1111	40	T10	FO1402	J1118	45		FO1402
HBT213V1	*J1111	42	T11	FO1402	J1114	31	15B	FO1402	J1118	47		FO1402
HBT214V1	*J1111	46	T12	FO1402	J1114	37	18B	FO1402	J1118	48		FO1402
HBT215V1	*J1111	48	T13	FO1402	J1114	40	19A	FO1402	J1118	52		FO1402
HBT216V1	*J1111	50	T14	FO1402	J1114	34	16A	FO1402	J1118	54		FO1402
HBT217V1	*J1111	52	T15	FO1402	J1114	43	23B	FO1402	J1118	51		FO1402
HBT218V1	*J1111	54	T16	FO1402	J1114	49	26B	FO1402	J1118	53		FO1402
HBT4COV	*J1133	14	08B	FO0901	J1147	14		FO0901				
HBT5KP	*J1105	33	16B	FO0901	J1104	69	35B	FO0901				
HBT5KQ	J1104	73	37B	FO0901	J1103	65	34B	FO0901	*J1105	31	15B	FO0901
	J1109	24	13A	FO0901								
HBT6KP	J1128	47	25B	FO0901	*J1105	35	17B	FO0901				
HBT6KQ	J1130	40	19A	FO0901	*J1105	37	18B	FO0901				
HBT7KQ	*J1130	37	18B	FO0901	J1128	49	26B	FO0901				
HBT8KQ	*J1105	55	29B	FO0901	J1103	74	35B	FO0901				

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HBUMBAV	*J1104	13	06A	FO0901	J1102	50		FO0901				
HBUPUO	*J1144	35		FO2700	J1146	01		FO2700				
HBUUTO	*J1107	51	27B	FO1803	J1106	25	12B	FO1802				
HBWAAA	J1127	47	24A	FO1600	*J1113	15	07B	FO1600				
HBWABA	J1127	50	22A	FO1600	J1128	36	17A	FO1600	*J1113	22	12A	FO1600
HBWACA	J1127	41	23B	FO1600	J1128	34	16A	FO1600	J1128	29	14B	FO1600
	*J1113	14	09A	FO1600								
HBWAEA	J1127	51	27B	FO1600	*J1113	27	13B	FO1600				
HBWAFA	J1127	64	33A	FO1600	J1128	31	15B	FO1600	*J1113	38	18A	FO1600
HBWAGA	J1127	61	31A	FO1600	*J1113	30	15A	FO1600				
HBWAHA	J1127	62	29A	FO1600	*J1113	33	16B	FO1600				
HBWAIA	J1127	55	29B	FO1600	*J1113	39	19B	FO1600	J1109	11	05B	FO0901
HBWAJA	J1126	22	12A	FO1600	J1128	35	17B	FO1600	J1127	59	31B	FO1600
	*J1113	52	24A	FO1600								
HBWAKA	*J1113	46	21A	FO1600	J1127	65	33B	FO1600	J1128	37	18B	FO1600
	J1126	24	13A	FO1600	J1147	47		FO1600				
HBWALA	J1126	26	14A	FO1600	*J1113	45	24B	FO1600				
HBWAMOV	*J1127	49	23A	FO1600	J1117	04	04A	FO1508				
HBWANOV	*J1127	48	21A	FO1600	J1117	11	05B	FO1508				
HBWAPOV	*J1127	46	22B	FO1600	J1117	24	13A	FO1508				
HBWAQO	*J1128	30	15A	FO1600	J1117	23	11B	FO1508				
HBWASOV	J1134	11	05B	FO1600	*J1127	53	26B	FO1600	J1117	40	19A	FO1508
HBWATOV	*J1127	66	32A	FO1600	J1117	17	08B	FO1508				
HBWAUO	J1128	33	16B	FO1600	J1117	18	10A	FO1508				
HBWAVOV	*J1127	63	30A	FO1600	J1117	08	06A	FO1300				
HBWAWOV	*J1127	60	28A	FO1600	J1117	03	02A	FO1508				
HBWAXOV	*J1127	56	28B	FO1600	J1109	22	12A	FO0901				
HBWAYAV	*J1141	03	03A	FO1802	J1142	78	38A	FO1802				
HBWAYO	J1141	04	02A	FO1802	J1146	27		FO1600	*J1126	20	11A	FO1600
HBWAZO	J1146	29		FO1600	*J1128	39	19B	FO1600				
HBWA10T	J1112	11	07A	FO1600	*J1108	08	04A	FO1600				
HBWA11T	J1112	06	05A	FO1600	*J1108	10	05A	FO1600				
HBWA12T	J1112	04	02A	FO1600	*J1108	14	06A	FO1600				
HBWA13T	J1112	05	03B	FO1600	*J1108	13	07A	FO1600				
HBWA14T	J1112	09	05B	FO1600	*J1108	17	08B	FO1600				
HBWA15T	J1112	15	07B	FO1600	*J1108	07	04B	FO1600				

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HBWA16T	J1112	22	14A	FO1600	*J1108	09	05B	FO1600				
HBWA17T	J1112	23	12A	FO1600	*J1108	11	06B	FO1600				
HBWA20T	J1112	20	10A	FO1600	*J1108	24	12A	FO1600				
HBWA21T	J1112	17	09B	FO1600	*J1108	26	13A	FO1600				
HBWA22T	J1112	21	11B	FO1600	*J1108	27	14A	FO1600				
HBWBAOV	J1146	80		FO1600	J1126	17	08B	FO1802	*J1127	57	30B	FO1600
HBWBBOV	J1137	34	16A	FO1803	*J1127	68	32B	FO1600				
HBWBCA	J1134	13	06B	FO1600	*J1126	31	15B	FO1600	J1146	08		FO1600
HBWBDA	*J1134	15	07B	FO1600	J1146	59		FO1600				
HBWC1A	J1107	33	16B	FO1600	*J1142	52	24A	FO1600				
HBWC2A	*J1107	39	19B	FO1600	J1142	64	30A	FO1600				
HBWC3R	*J1107	50	23A	FO1600	J1142	62	29A	FO1600				
HBWC3S	J1107	56	26A	FO1600	*J1142	60	28A	FO1600	J1146	67		FO1600
HBW1AOV	J1113	11	05B	FO1600	*J1112	13	06A	FO1600				
HBW1BOV	J1113	56	26A	FO1600	J1113	50	23A	FO1600	*J1112	18	09A	FO1600
HBW2AOV	J1113	34	16A	FO1600	*J1112	08	04A	FO1600				
HBW2BOV	J1113	43	23B	FO1600	J1113	37	18B	FO1600	J1113	31	15B	FO1600
	J1113	20	11A	FO1600	*J1112	14	08B	FO1600				
HBW3AOV	J1113	17	08B	FO1600	*J1112	03	03A	FO1600				
HBW3BOV	J1142	56	26A	FO1600	J1113	42	20A	FO1600	J1113	36	17A	FO1600
	J1113	26	14A	FO1600	J1113	25	12B	FO1600	J1113	13	06B	FO1600
	J1113	19	09B	FO1600	*J1112	19	10B	FO1603				
HBW4AOV	J1113	54	25A	FO1600	J1113	23	11B	FO1600	*J1112	01	02B	FO1600
HBW5AOV	J1113	40	19A	FO1600	J1113	41	22B	FO1600	J1112	07	04B	FO1600
HBW6AOV	J1113	29	14B	FO1600	J1113	24	13A	FO1600	J1112	10	06B	FO1600
HBW7AOV	J1142	54	25A	FO1600	J1113	35	17B	FO1600	J1112	24	13A	FO1600
HBW8AOV	J1113	48	22A	FO1600	J1113	18	10A	FO1600	J1112	25	11A	FO1600
HBYAPA	J1113	71	36A	FO0400	*J1109	63	33B	FO0400				
HBYA1OV	J1145	23		FO0400	J1124	60		FO1201	J1113	60		FO1203
	J1122	60		FO1203	J1122	37		FO1203	J1113	37		FO1201
	J1124	37		FO1201	J1124	13		FO1201	J1113	13		FO1201
	J1122	13		FO1203	*J1116	40	19A	FO0400				
HBYA2OV	J1145	24		FO0400	J1124	59		FO1201	J1123	59		FO1203
	J1122	59		FO1203	J1122	39		FO1203	J1123	39		FO1203
	J1124	39		FO1201	J1124	17		FO1201	J1123	17		FO1201
	J1122	17		FO1203	*J1116	34	15A	FO0400				
HBYA3OV	J1145	25		FO0400	J1124	61		FO1201	J1123	61		FO1203

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	J1122	61		FO1203	J1122	41		FO1203	J1123	41		FO1203
	J1124	41		FO1201	J1124	19		FO1202	J1123	19		FO1201'
	J1122	19		FO1203	*J1116	31	16B	FO0400	*J1116	54	25A	FO0400
	J1122	69		FO1203	J1123	69		FO1203	J1124	69		FO1201
	J1124	49		FO1201	J1123	49		FO1203	J1122	49		FO1203
	J1122	25		FO1203	J1123	25		FO1201	J1124	25		FO1202
	J1145	26		FO0400								
HBYA5OV	J1145	27		FO0400	J1124	71		FO1201	J1123	71		FO1203
	J1122	71		FO1203	J1122	51		FO1203	J1123	51		FO1203
	J1124	51		FO1201	J1124	27		FO1202	J1123	27		FO1201
	J1122	27		FO1203	*J1116	48	21A	FO0400				
HBYA6OV	J1145	29		FO0400	J1124	73		FO1201	J1123	73		FO1203
	J1122	73		FO1203	J1122	53		FO1203	J1123	53		FO1203
	J1124	53		FO1201	J1124	31		FO1202	J1123	31		FO1201
	J1122	31		FO1203	*J1116	43	24B	FO0400				
HBYBPA	J1113	73		FO0400	J1112	79	39B	FO0400	*J1109	55	29B	FO0400
HBYBPOV	J1147	43		FO0400	*J1112	80	38B	FO0400				
HBYB1OV	J1121	60		FO1201	J1120	60		FO1203	J1119	60		FO1203
	*J1116	37		FO0400	J1119	37		FO1203	J1120	37		FO1203
	J1121	37		FO1201	J1121	13		FO1202	J1120	13		FO1201
	J1119	13		FO1203								
HBYB2OV	J1121	59		FO1201	J1120	59		FO1203	J1119	59		FO1203
	J1119	39		FO1203	J1120	39		FO1203	J1121	39		FO1201
	J1121	17		FO1202	J1120	17		FO1201	J1119	17		FO1203
	*J1116	30		FO0400								
HBYB3OV	J1119	61		FO1203	J1120	61		FO1203	J1121	61		FO1201
	J1121	41		FO1201	J1120	41		FO1203	J1119	41		FO1203
	*J1116	42		FO0400	J1119	19		FO1203	J1120	19		FO1201
	J1121	19		FO1202								
HBYB4OV	J1119	69		FO1203	J1120	69		FO1203	J1121	69		FO1201
	J1121	49		FO1201	J1120	49		FO1203	J1119	49		FO1203
	*J1116	49		FO0400	J1119	25		FO1203	J1120	25		FO1201
	J1121	25		FO1202								
HBYB5OV	J1119	71		FO1203	J1120	71		FO1203	J1121	71		FO1201
	J1121	51		FO1201	J1120	51		FO1203	J1119	51		FO1203
	*J1116	46		FO0400	J1119	27		FO1203	J1120	27		FO1201
	J1121	27		FO1202								

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution													
HBYB60V	J1119	73		FO1203	J1120	73		FO1203	J1121	73		FO1201
	J1121	53		FO1201	J1120	53		FO1203	J1119	53		FO1203
	*J1116	53		FO0400	J1119	31		FO1203	J1120	31		FO1201
	J1121	31		FO1202								
HBYCPO	J1125	25B		FO0400	J1115	69		FO0400	*J1113	72	34A	FO0400
HBOPNAV	J1128	24	13A	FO0100	*J1116	13	06A	FO0100				
HB20AAV	J1126	79	39B	FO0100	J1126	65	34B	FO0100	*J1127	34	15A	FO0100
	J1113	08	06A	FO0100	*J1127	37	17A	FO0100	J1117	64	30A	FO0100
HB21BOV	J1127	35	18A	FO0100	J1128	26	14A	FO0100	J1117	68	32A	FO0100
	*J1116	08	04A	FO0100								
HB500OV	J1135	35	17B	FO1803	J1135	42	20A	FO1803	J1135	52	24A	FO1803
	J1126	52	24A	FO1803	J110	09	06B	FO1802	*J1104	70	34B	FO0901
HCCFZ1	J1138	66		FO2300	J1138	76		FO2001	J1145	57		FO2001
HCCFZ2	J1138	72		FO2300	J1138	78		FO2001	J1145	59		FO2001
HCCFZ3	J1139	23		FO2300	J1139	35		FO2001				
HCCFZ3	J1145	03		FO2001								
HCCFZ4	J1139	25		FO2300	J1139	37		FO2001	J1145	04		FO2001
HCCFZ5	J1139	29		FO2300	J1139	39		FO2001	J1145	05		FO2001
HCCFZ6	J1139	36		FO2300	J1139	42		FO2001	J1145	06		FO2001
HCDDIO1	J1144	14		FO1801	J1128	77	38B	FO1801	J1118	78		FO1801
HCDIDO	J1145	77		FO1801	J1144	13		FO1801				
HCE01A	J1146	30		FO2001	J1132	01	02B	FO2001	J1132	01	02B	FO1700
HCE02A	J1146	31		FO2001	J1132	04	04A	FO2001	J1132	04	04A	FO1700
HCE03A	J1146	33		FO2001	J1132	05	03B	FO2001	J1132	05	03B	FO1700
HCE04A	J1146	34		FO2001	J1132	06	05A	FO2001	J1132	06	05A	FO1700
HCE05A	J1146	35		FO2001	J1132	07	03A	FO2001	J1132	07	03A	FO1700
HCE06A	J1146	36		FO2001	J1132	08	06A	FO2001	J1132	08	06A	FO1700
HCE07A	J1146	37		FO2001	J1132	10	07A	FO2001	J1132	10	07A	FO1700
HCE08A	J1146	38		FO2001	J1132	13	06B	FO2001	J1132	13	06B	FO1700
HCE09A	J1146	39		FO2002	J1132	14	09A	FO2002	J1132	14	09A	FO1700
HCE10A	J1146	40		FO2002	J1132	18	10A	FO2002	J1132	18	10A	FO1700
HCE11A	J1146	41		FO2002	J1132	19	09B	FO2002	J1132	19	09B	FO1700
HCE12A	J1146	42		FO2002	J1132	20	11A	FO2002	J1132	20	11A	FO1700
HCE13A	J1146	43		FO2002	J1106	77	38B	FO2002	J1106	77	38B	FO1700
HCE14A	J1146	45		FO2002	J1106	78	38A	FO2002	F1106	78	38A	FO1700
HCE15A	J1146	46		FO2002	J1106	79	39B	FO2002	J1106	79	39B	FO1700
HCE16A	J1146	47		FO2002	J1126	49	26B	FO2002	J1126	49	26B	FO1700

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal					Distribution						
HCB17A	J1146	48			FO2002	J1126	45	24B	FO2002	J1126	45	24B	FO1700
HCE18A	J1146	49			FO2002	J1126	47	25B	FO2002	J1126	47	25B	FO1700
HCFIZ1	J1138	25			FO2001	J1138	25		FO2300	J1138	25		FO2401
	J1138	37			FO2001	J1138	37		FO2300	J1138	37		FO2401
	J1145	45										
HCFIZ2	J1138	29			FO2001	J1138	29		FO2300	J1138	29		FO2401
	J1138	39			FO2001	J1138	39		FO2300	J1138	39		FO2401
	J1145	46			FO2001	J1145	46		FO2300	J1145	46		FO2401
HCFIZ3	J1138	36			FO2002	J1138	36		FO2300	J1138	36		FO2401
	J1138	42			FO2002	J1138	42		FO2300	J1138	42		FO2401
	J1145	47										
HCFIZ4	J1138	38			FO2002	J1138	38		FO2300	J1138	38		FO2401
	J1138	46			FO2002	J1138	46		FO2300	F1138	46		FO2401
	J1145	48			FO2002	J1145	48		FO2300	J1145	48		FO2401
HCFIZ5	J1138	41			FO2002	J1138	41		FO2300	J1138	41		FO2401
	J1138	51			FO2002	J1138	51		FO2300	J1138	51		FO2401
	J1145	49										
HCFIZ6	J1138	45			FO2002	J1138	45		FO2300	J1138	45		FO2401
	J1138	53			FO2002	J1138	53		FO2300	J1138	53		FO2401
	J1145	50			FO2002	J1145	50		FO2300	J1145	50		FO2401
HCFOZ1	J1138	47			FO2002	J1138	47		FO2300	J1138	47		FO2401
	J1138	55			FO2002	J1138	55		FO2300	J1138	55		FO2401
	J1145	51			FO2002	J1145	51		FO2300	J1145	51		FO2401
HCFOZ2	J1138	48			FO2002	J1138	48		FO2300	J1138	48		FO2401
	J1138	56			FO2002	J1138	56		FO2300	J1138	56		FO2401
	J1145	52			FO2002	J1145	52		FO2300	J1145	52		FO2401
HCFOZ3	J1138	52			FO2002	J1138	52		FO2300	J1138	52		FO2401
	J1138	62			FO2002	J1138	62		FO2300	J1138	62		FO2401
	J1145	53			FO2002	J1145	53		FO2300	J1145	53		FO2401
HCFOZ4	J1138	61			FO2002	J1138	61		FO2300	J1138	61		FO2401
	J1138	71			FO2002	J1138	71		FO2300	J1138	71		FO2401
	J1145	54			FO2002	J1145	54		FO2300	J1145	54		FO2401
HCFOZ5	J1138	63			FO2002	J1138	63		FO2300	J1138	63		FO2401
	J1138	73			FO2002	J1138	73		FO2300	J1138	73		FO2401
	J1145	55			FO2002	J1145	55		FO2300	J1145	55		FO2401
HCFOZ6	J1138	65			FO2002	J1138	65		FO2300	J1138	65		FO2401
	J1138	75			FO2002	J1138	75		FO2300	J1138	75		FO2401

Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	J1145	56		FO2002	J1145	56		FO2300	J1145	56	FO2401	
HCI01A	J1146	54		FO2103	J1142	05	03B	FO1802				
HCI02A	J1146	55		FO2104	J1142	07	03A	FO1802				
HCJAPD6	J1145	67		FO2300	J1138	19		FO2300	J1138	07	FO2300	
	J1145	62		FO2300								
HCJARD6	J1145	76		FO2300	J1138	24		FO2300	J1138	09	FO2300	
	J1145	63		FO2300								
HCPRB+51	J1118	66		FO1900	J1146	06		FO1900				
HCP5LO	J1146	68		FO1900	J1130	62	29A	FO1801				
HCP5MO	J1146	66		FO1900	J1130	68	32A	FO1801				
HC01AO1	J1139	52		FO0100	J1136	75		FO0100	J1117	54	25A	FO0100
	J1116	73	37B	FO0100								
HCO1A06	J1145	71		FO0100	J1139	49		FO0100				
HCO1BO1	J1139	72		FO0100	J1136	76		FO0100	J1128	65	34B	FO0100
	J1116	74	35A	FO0100								
HC01B06	J1145	78		FO0100	J1139	70		FO0100				
HC1GND	J1146	02		FO2700	J1144	06		FO2700				
HC10SP	J1146	50		FO1900	J1130	10	07A	FO1803				
HC20AO1	J1136	47		FO0100	J1116	75	39A	FO0100	J1109	33	16B	FO0100
HC20SP	J1130	79	39B	FO1801	J1140	79	39B	FO0100	J1140	70	33A	FO0100
	J1146	51		FO1900								
HC21BO	J1146	05		FO1900	J1116	06	05A	FO0100				
HC21CO	J1146	04		FO1900	J1116	11	07A	FO0100				
HC40AO1	J1138	40		FO0100	J1136	77		FO0100	J1104	45	25B	FO0100
	J1103	37	18B	FO0100								
HC40AO6	J1145	73		FO0100	J1138	30		FO0100				
HC40BO1	J1139	40		FO0100	J1136	78		FO0100	J1112	73	37B	FO0100
	J1109	71	36A	FO0100								
HC40BO6	J1145	74		FO0100	J1139	30		FO0100				
HC51LO	J1146	63		FO1900	J1135	29	14B	FO1803				
HCS1MO	J1146	60		FO1900	J1135	21	10B	FO1803				
HC52LO	J1146	64		FO1900	J1135	30	15A	FO1803				
HC52MO	J1146	61		FO1900	J1135	23	11B	FO1803				
HC53LO	J1146	65		FO1900	J1135	34	16A	FO1803				
HC53MO	J1146	62		FO1900	J1135	25	12B	FO1803				
V14228	J1142	28		FO2700	*J1144	45		FO2700				
WBCCRA1	J1134	37	18B	FO2401	J1136	25		FO2401				

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Table 7-7. Left Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution										
WBCCSA1	J1142	34	16A	FO2401	J1142	34	16A	FO2200	J1136	23	FO2401
WBCLTA6	J1139	08		FO2300	J1139	08		FO2401	J1139	20	FO2300
	J1139	20		FO2401	J1145	68		FO2401			
WBDLTA6	J1139	07		FO2300	J1139	07		FO2401	J1139	19	FO2300
	J1139	19		FO2401	J1145	66		FO2401			
WBDRRA1	J1134	07	03A	FO2200	J1134	07	03A	FO2401	J1136	20	FO2401
WBDRSA1	J1142	17	08B	FO2200	J1142	17	08B	FO2401	J1136	19	FO2401
WBLTEA1	J1138	03		FO2401	J1138	04		FO2401	J1138	21	FO2401
	J1138	22		FO2401	J1136	38		FO2401	J1138	49	FO2401
	J1138	50		FO2401	J1138	69		FO2401	J1138	70	FO2401
	J1139	22		FO2401	J1139	21		FO2401	J1139	04	FO2401
	J1139	03		FO2401							
WBRCRA1	J1134	31	15B	FO2200	J1134	31	15B	FO2401	J1136	26	FO2401
WBRCSA1	J1142	40	19A	FO2200	J1142	40	19A	FO2401	J1136	24	FO2401
WBSTPO1	J1104	11	07A	FO0901	J1118	64		FO0901	J1118	64	FO2700
	*J1144	11		FO0901	*J1144	11		FO2700			
WBSTRA1	J1134	56	26A	FO2200	J1134	56	26A	FO2401	J1136	30	FO2401
WBSTSA1	J1142	29	14B	FO2200	J1142	29	14B	FO2401	J1136	29	FO2402
WBU56A1	J1107	49	26B	FO1803	J1141	74	35A	FO1803	J1136	08	FO1803
WBU57A1	J1107	45	24B	FO1803	J1141	05	03B	FO1803	J1136	09	FO1803
WB10704	J1129	08		FO2700	J1145	01		FO2700			
WLOVRA	*J1144	40		FO2700	J1145	72		FO2700			
WSTDTA	J1145	79		FO2402	J1142	53	28B	FO1802	J1135	01	02B	FO1802
	J1126	40	19A	FO1802							
WSWGND	*J1144	61		FO2700	J1145	70		FO2700			
WTSBCA1	J1109	03	02A	FO0901	J1104	76	37A	FO0901	J1116	62	FO0901
	J1145	41		FO2403							
WTSSCA1	J1104	39	19B	FO0901	J1118	56		FO0901	J1145	40	FO2403
WTSSSA1	J1104	74	35A	FO0901	J1118	55		FO0901	J1145	39	FO2403

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup

Signal	Distribution										
HAACMAV	*J2141	72	34A	FO0300	J2136	74	35A	FO0300			
HAACMOV	J2139	61	31B	FO0300	*J2136	72	34A	FO0300			
HAACMIU	J2141	52	26A	FO0300	*J2139	38	18A	FO0300			
HAACM2U	J2141	47	24A	FO0300	*J2139	40	19A	FO0300			
HAACM3U	J2141	50	22A	FO0300	*J2139	42	20A	FO0300			
HAACM4U	J2141	41	23B	FO0300	*J2139	46	21A	FO0300			
HAACM5U	J2141	74	35A	FO0300	*J2139	36	17A	FO0300			
HAACN1U	J2141	45	25B	FO0300	*J2139	54	26A	FO0300			
HAACN2U	J2141	51	27B	FO0300	*J2139	56	28B	FO0300			
HAAM1AV	*J2141	54	25A	FO0300	J2136	51	27B	FO0300			
HAAM1CV	J2137	13		FO0604							
HAAM1OV	J2133	13		FO0602	J2130	13		FO0601	J2130	37	FO0601
	J2133	37		FO0602	J2137	37		FO0604	J2137	60	FO0605
	*J2136	53	26B	FO0300	J2133	60		FO0602	J2130	60	FO0601
HAAM2AV	*J2141	49	23A	FO0300	J2136	64	33A	FO0300			
HAAM2OV	J2130	59		FO0601	J2133	59		FO0602	J2133	39	FO0602
	J2130	39		FO0601	J2130	17		FO0601	J2133	17	FO0603
	J2137	17		FO0604	J2137	39		FO0605	J2137	59	FO0605
	*J2136	66	32A	FO0300							
HAAM3AV	*J2141	48	21A	FO0300	J2136	61	31A	FO0300			
HAAM3OV	J2137	19		FO0604	J2137	41		FO0604	J2137	61	FO0605
	*J2136	63	30A	FO0300	J2133	61		FO0602	J2130	61	FO0601
	J2130	41		FO0601	J2133	41		FO0602	J2133	19	FO0602
	J2130	19		FO0601							
HAAM4AV	*J2141	46	22B	FO0300	J2136	62	29A	FO0300			
HAAM4OV	J2137	25		FO0604	J2137	49		FO0605	*J2136	60 28A	FO0300
	J2137	69		FO0604	J2133	69		FO0602	J2130	69	FO0601
	J2130	49		FO0601	J2133	49		FO0602	J2133	25	FO0603
	J2130	25		FO0601							
HAAM5AV	*J2141	43		FO0300	J2136	55		FO0300			
HAAM5OV	J2137	27		FO0604	J2137	51		FO0605	J2136	56 28B	FO0300
	J2137	71		FO0604	J2133	71		FO0602	J2130	71	FO0601
	J2130	51		FO0601	J2133	51		FO0602	J2133	27	FO0603
	J2130	27		FO0601							
HAAM6AV	*J2141	53		FO0300	J2136	59		FO0300			
HAAM6OV	J2130	73		FO0601	J2133	73		FO0602	J2133	53	FO0603
	J2130	53		FO0601	J2130	31		FO0601	J2133	31	FO0602

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution											
	J2137	31		FO0604	J2137	53		FO0605	*J2136	57	30B	FO0300
	J2137	73		FO0605								
HACKMAV	J2139	51	25B	FO0300	J2139	37	17B	FO0300	*J2136	77	38A	FO0300
HACKMO	J2136	75	39A	FO0300	*J2138	69	35A	FO0300				
HACMC1V1	J2132	05		FO0300	*J2142	I5	T01	FO0300	J2139	39	18B	FO0300
HACMC2V1	J2132	06		FO0300	*J2142	18	T02	FO0300	J2139	41	19B	FO0300
HACMC3V1	J2132	07		FO0300	*J2142	20	T03	FO0300	J2139	43	22B	FO0300
HACMC4V1	J2132	08		FO0300	*J2142	22	T04	FO0300	J2139	45	23B	FO0300
HACMC5V1	J2132	09		FO0300	*J2142	24	T05	FO0300	J2139	53	26B	FO0300
HACMC6V1	J2132	10		FO0300	*J2142	26	T06	FO0300	J2139	55	27B	FO0300
HACMC7V1	*J2142	29	T07	FO0300	J2139	04	02A	FO0300	J2132	17		FO0300
	J2134	11	05B	FO0300								
HACMC8V1	*J2142	34	T08	FO0300	J2139	06	03A	FO0300	J2132	18		FO0300
	J2134	13	06B	FO0300								
HACP3AV	J2114	74	35B	FO1506	J2114	64	30A	FO1504	J2117	49	26B	FO1505
	J2117	42	20A	FO1504	J2114	31	15B	FO1504	*J2112	08	04A	FO1507
	J2117	13	06B	FO1505								
HACP3OV	J2112	06	05A	FO1507	*J2108	10	063	FO1507				
HACWAA	*J2134	15	07B	FO0300	J2136	76	37A	FO0300	J2101	56		FO0300
HADAAAV	*J2108	13	06A	FO1501	J2107	08	06A	FO1501				
HADAAO	J2147	03	03B	FO1401	J2108	11	07A	FO1501	*J2106	06	05A	FO1501
	*J2106	06	05A	FO2403								
HADABAV	*J2108	01	02B	FO1501	J2107	04	04A	FO1501				
HADABO	J2147	01	02B	FO1401	J2108	05	03B	FO1501	*J2106	01	02B	FO1501
	*J2106	01	02B	FO2403								
HADACAV	*J2108	07	04B	FO1501	J2107	03	02A	FO1501				
HADACO	J2147	04	02A	FO1401	J2108	09	05B	FO1501	*J2106	09	04B	FO1501
	*J2106	09	04B	FO2403								
HADADAV	*J2108	25	11A	FO1501	J2107	11	05B	FO1501				
HADADO	J2147	06	03A	FO1401	*J2109	01	02B	FO1501	J2108	23	12A	FO1501
	J2108	23	12A	FO2403								
HADAEAV	*J2108	18	09A	FO1501	J2107	24	13A	FO1501				
HADAEO	J2146	17	09B	FO1401	J2108	20	10A	FO1501	*J2106	15	07B	FO1501
	*J2106	15	07B	FO2403								
HADAFAV	*J2108	14	08B	FO1501	J2107	18	10A	FO1501				
HADAFO	J2146	15	08B	FO1401	*J2109	15	07B	FO1501	*J2109	15	07B	FO2403

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution											
	J2108	17	09B	FO1501								
HADAGAV	*J2108	19	10B	FO1502	J2107	17	08B	FO1502				
HADAGO	J2146	18	09A	FO1401	*J2109	22	12A	FO1502	*J2109	22	12A	FO2403
	J2108	21	11B	FO1502								
HADAHAV	*J2108	26	12B	FO1502	J2107	23	11B	FO1502				
HADAHO	J2146	20	10A	FO1401	*J2109	14	09A	FO1502	*J2109	14	09A	FO2403
	J2108	27	13B	FO1502								
HADAIAV	*J2108	37	17A	FO1502	J2107	40	19A	FO1502				
HADAIO	J2147	31	15B	FO1401	*J2109	21	10B	FO1502	*J2109	21	10B	FO2403
	J2108	35	18A	FO1502								
HADAJAV	*J2108	34	15A	FO1502	J2107	34	16A	FO1502				
HADAJO	J2147	29	14B	FO1401	J2108	36	16A	FO1502	*J2106	52	24A	FO1502
	*J2106	52	24A	FO2403								
HADAKAV	*J2108	30	14B	FO1502	J2107	29	14D	FO1502				
HADAKO	J2147	30	15A	FO1401	J2108	29	15B	FO1502	*J2106	46	21A	FO1502
	*J2106	46	21A	FO2403								
HADALAV	*J2108	31	16B	FO1502	J2107	35	17B	FO1502				
HADALO	J2147	34	16A	FO1401	J2108	33	17B	FO1502	*J2106	45	24B	FO1502
	*J2106	45	24B	FO2403								
HADAMAV	*J2108	42	18B	FO1501	J2107	54	25A	FO1501				
HADAMO	J2145	43	23B	FO1401	J2108	39	19B	FO1501	*J2106	66	31A	FO1501
	*J2106	66	31A	FO2403								
HADANAV	*J2108	54	25A	FO1501	J2107	48	22A	FO1501				
HADANO	J2145	41	22B	FO1401	J2108	52	26A	FO1501	*J2106	60	28A	FO1501
	*J2106	60	28A	FO2403								
HADAPAV	*J2108	49	23A	FO1501	J2107	41	22B	FO1501				
HADAPO	J2145	46	21A	FO1401	*J2109	52	24A	FO1501	*J2109	52	24A	FO2403
	J2108	47	24A	FO1501								
HADAQAV	*J2108	48	21A	FO1500	J2107	47	25B	FO1501				
HADAQO	J2145	48	22A	FO1401	*J2109	46	21A	FO1501	*J2109	46	21A	FO2403
	J2108	50	22A	FO1501								
HADARAV	*J2108	46	22B	FO1501	J2107	68	32A	FO1501				
HADARO	J2146	55	29B	FO1401	*J2109	66	31A	FO1501	*J2109	66	31A	FO2403
	J2108	41	23B	FO1501								
HADASAV	*J2108	43	24B	FO1501	J2107	62	29A	FO1501				
HADASO	J2146	53	28B	FO1401	*J2109	60	28A	FO1501	*J2109	60	28A	FO2403

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	J2108	45	25B	FO1501								
HADATAV	*J2108	53	26B	FO1502	J2107	53	28B	FO1502				
HADATO	J2146	57	28A	FO1401	*J2109	57	30B	FO1502	*J2109	57	30B	FO2403
	J2108	51	27B	FO1502								
HADAUAV	*J2108	66	32A	FO1502	J2107	59	31B	FO1502				
HADAUO	J2146	60	29A	FO1401	*J2109	63	33B	FO1502	*J2109	63	33B	FO2403
	J2108	64	33A	FO1502								
HADBAAV	*J2108	80	38B	FO1502	J2107	77	38B	FO1502				
HADBAO	J2147	71	35B	FO1401	J2108	79	39B	FO1502	*J2106	75	37B	FO1502
	*J2106	75	37B	FO2403								
HADBBAV	*J2108	71	36B	FO1502	J2107	71	36A	FO1502				
HADBBO	J2147	69	34B	FO1401	J2108	73	37B	FO1502	*J2106	72	34A	FO1502
	*J2106	72	34A	FO2403								
HADBCAV	*J2108	70	34B	FO1502	J2107	65	34B	FO1502				
HADBCO	J2147	70	34A	FO1401	J2108	69	35B	FO1502	*J2106	69	35A	FO1502
	*J2106	69	35A	FO2403								
HADBDAV	*J2108	72	34A	FO1502	J2107	76	37A	FO1502				
HADBDO	J2147	72	35A	FO1401	*J2109	75	37B	FO1502	*J2109	75	37B	FO2403
	J2108	74	35A	FO1502								
HADBEAV	*32112	03	03A	FO1503	J2110	08	06A	FO1503				
HADBEO	J2146	03	03B	FO1401	J2112	04	02A	FO1503	*J2111	06	05A	FO1503
	*J2111	06	05A	FO2403								
HADBFAV	*J2112	01	02B	FO1503	J2110	04	04A	FO1503				
HADBFO	J2146	01	02B	FO1401	J2112	05	03B	FO1503	*J2111	01	02B	FO1503
	*J2111	01	02B	FO2403								
HADBGAV	*J2112	07	04B	FO1503	J2110	03	02A	FO1503				
HADBGO	J2146	04	02A	FO1401	J2112	09	05B	FO1503	*J2111	09	04B	FO1503
	*J2111	09	04B	FO2403								
HADBHAV	*J2112	10	06B	FO1503	J2110	11	05B	FO1503				
HADBHO	J2146	06	03A	FO1401	J2112	15	07B	FO1503	*J2111	15	07B	FO1503
	*J2111	15	07B	FO2403								
HADBIAV	*J2111	24	13A	FO1503	J2110	24	13A	FO1503				
HADBIO	J2145	17	09B	FO1401	J2112	22	14A	FO1503	*J2111	22	12A	FO1503
	*J2111	22	12A	FO2403								
HADBJAV	*J2112	25	11A	FO1503	J2110	18	10A	FO1503				
HADBJO	J2112	23	12A	FO1503	*J2111	14	09A	FO1503	*J2111	14	09A	FO2403

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	J2145	15	08B	FO1401								
HADBKAV	*J2112	18	09A	FO1504	J2110	17	08B	FO1504				
HADBKO	J2145	18	09A	FO1401	J2112	20	10A	FO1504	*J2111	21	10B	FO1504
	*J2111	21	10B	FO2403								
HADBLAV	*J2112	14	08B	FO1504	J2110	23	11B	FO1504				
HADBLO	J2145	20	10A	FO1401	J2112	17	09B	FO1504	*J2111	27	13B	FO1504
	*J2111	27	13B	FO2403								
HADBMAV	*J2112	34	15A	FO1504	J2110	40	19A	FO1504				
HADBMO	J2146	31	15B	FO1401	J2112	36	16A	FO1504	*J2111	38	18A	FO1504
	*J2111	38	18A	FO2403								
HADBNAV	*J2112	30	14B	FO1504	J2110	34	16A	FO1504				
HADBNO	J2146	29	14B	FO1401	J2112	29	15B	FO1504	*J2111	30	15A	FO1504
	*J2111	30	15A	FO2403								
HADBPAV	*J2112	31	16B	FO1504	J2110	29	14B	FO1504				
HADBPO	J2146	30	15A	FO1401	J2112	33	17B	FO1504	*J2111	33	16B	FO1504
	*J2111	33	16B	FO2403								
HADBQAV	*J2112	42	18B	FO1504	J2110	35	17B	FO1504				
HADBQO	J2146	34	16A	FO1401	J2112	39	19B	FO1504	*J2111	39	19B	FO1504
	*J2111	39	19B	FO2403								
HADBRAV	*J2112	54	25A	FO1503	J2110	54	25A	FO1503				
HADBRO	J2145	03	03B	FO1401	J2112	52	26A	FO1503	*J2111	52	24A	FO1503
	*J2111	52	24A	FO2403								
HADBSAV	*J2112	49	23A	FO1503	J2110	48	22A	FO1503				
HADBSO	J2145	01	02B	FO1401	J2112	47	24A	FO1503	*J2111	46	21A	FO1503
	*J2111	46	21A	FO2403								
HADBTAV	*J2112	48	21A	FO1503	J2110	41	22B	FO1503				
HADBTO	J2145	04	02A	FO1401	J2112	50	22A	FO1503	*J2111	45	24B	FO1503
	*J2111	45	24B	FO2403								
HADBUAV	*J2112	46	22B	FO1503	J2110	47	25B	FO1503				
HADBUO	J2145	06	03A	FO1401	J2112	41	23B	FO1503	*J2111	51	27B	FO1503
	*J2111	51	27B	FO2403								
HADBVAV	*J2112	57	30B	FO1503	J2110	68	32A	FO1503				
HADBVO	J2147	17	09B	FO1401	J2112	59	31B	FO1503	*J2111	66	31A	FO1503
	*J2111	66	31A	FO2403								
HADBWAV	*J2112	68	32B	FO1503	J2110	62	29A	FO1503				
HADBWO	J2112	65	33B	FO1503	*J2111	60	28A	FO1503	*J2111	60	28A	FO2403

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	J2147	15	08B	FO1401								
HADCAAV	*J2112	80	38B	FO1504	J2110	53	28B	FO1504				
HADCAO	J2112	79	39B	FO1504	*J2111	57	30B	FO1504	*J2111	57	30B	FO2403
	J2147	18	09A	FO1401								
HADCBAV	*J2112	71	36B	FO1504	J2110	59	31B	FO1504				
HADCBO	J2112	73	37B	FO1504	*J2111	63	33B	FO1504	*J2111	63	33B	FO2403
	J2147	20	10	FO1401								
HADCCAV	*J2112	70	34B	FO1504	J2110	77	38B	FO1504				
HADCCO	J2145	31	15B	FO1401	J2112	69	35B	FO1504	*J2111	75	37B	FO1504
	*J2111	75	37B	FO2403								
HADCDAV	*J2112	72	34A	FO1504	J2110	71	36A	FO1504				
HADCDO	J2145	29	14B	FO1401	J2112	74	35A	FO1504	*J2111	72	34A	FO1504
	*J2111	72	34A	FO2403								
HADCEAV	J2112	78	36A	FO1504	J2110	65	34B	FO1504				
HADCEO	J2145	30	15A	FO1401	J2112	76	37A	FO1504	*J2111	69	35A	FO1504
	*J2111	69	35A	FO2403								
HADCFAV	*J2112	77	38A	FO1504	J2110	76	37A	FO1504				
HADCFO	J2145	34	16A	FO1401	J2112	75	39A	FO1504	*J2111	80	39A	FO1504
	*J2111	80	39A	FO2403								
HADCGAV	*J2116	13	06A	FO1505	J2113	08	06A	FO1505				
HADCGO	J2147	43	23B	FO1401	J2116	11	07A	FO1505	*J2115	06	05A	FO1505
	*J2115	06	05A	FO2403								
HADCHAV	*J2116	08	04A	FO1505	J2113	04	04A	FO1505				
HADCHO	J2147	41	22B	FO1401	J2116	06	05A	FO1505	*J2115	01	02B	FO1505
	*J2115	01	02B	FO2403								
HADCIAV	*J2116	03	03A	FO1505	J2113	03	02A	FO1505				
HADCIO	J2147	46	21A	FO1401	J2116	04	02A	FO1505	*J2115	09	04B	FO1505
	*J2115	09	04B	FO2403								
HADCJAV	*J2116	01	02B	FO1505	J2113	11	05B	FO1505				
HADCJO	J2116	05	03B	FO1505	*J2115	15	07B	FO1505	*J2115	15	07B	FO2403
	J2147	48	22A	FO1401								
HADCKAV	*J2116	07	04B	FO1505	J2113	24	13A	FO1505				
HADCKO	J2116	09	05B	FO1505	*J2115	22	12A	FO1505	*J2115	22	12A	FO2403
	J2145	55	29B	FO1401								
HADCLAV	*J2116	10	06B	FO1505	J2113	18	10A	FO1505				
HADCLO	J2145	53	28B	FO1401	J2116	15	07B	FO1505	*J2115	14	09A	FO1505

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	*J2115	14	09A	FO2403								
HADCMAV	*J2116	24	13A	FO1506	J2113	17	08B	FO1506				
HADCMO	J2145	57	28A	FO1401	J2116	22	14A	FO1506	*J2115	21	10B	FO1506
	*J2115	21	10B	FO2403								
HADCNAV	*J2116	26	12B	FO1506	J2113	23	11B	FO1506				
HADCNO	J2145	60	29A	FO1401	J2116	27	13B	FO1506	*J2115	27	13B	FO1506
	*J2115	27	13B	FO2403								
HADCPAV	*J2116	40	19A	FO1506	J2113	40	19A	FO1506				
HADCPO	J2147	55	29B	FO1401	J2116	38	20A	FO1506	*J2115	38	18A	FO1506
	*J2115	38	18A	FO2403								
HADCQAV	*J2116	37	17A	FO1506	J2113	34	16A	FO1506				
HADCQO	J2147	53	28B	FO1401	J2116	35	18A	FO1506	*J2115	30	15A	FO1506
	*J2115	30	15A	FO2403								
HADCRAV	*J2116	34	15A	FO1506	J2113	29	14B	FO1506				
HADCRO	J2147	57	28A	FO1401	J2116	36	16A	FO1506	*J2115	33	16B	FO1506
	*J2115	33	16B	FO2403								
HADCSAV	*J2116	30	14B	FO1506	J2113	35	17B	FO1506				
HADCSO	J2116	29	15B	FO1506	*J2115	39	19B	FO1506	*J2115	39	19B	FO1505
	J2147	60	29A	FO1401								
HADCTAV	*J2116	31	16B	FO1505	J2113	54	25A	FO1505				
HADCTO	J2146	43	23B	FO1401	J2116	33	17B	FO1505	*J2115	52	24A	FO1505
	*J2115	52	24A	FO2403								
HADCUAV	*J2116	42	18B	FO1505	J2113	48	22A	FO1505				
HADCUO	J2146	41	22B	FO1401	J2116	39	19B	FO1505	*J2115	46	21A	FO1505
	*J2115	46	21A	FO2403								
HADCVAV	*J2116	54	25A	FO1505	J2113	41	22B	FO1505				
HADCVO	J2146	46	21A	FO1401	J2116	52	26A	FO1505	*J2115	45	24B	FO1505
	*J2115	45	24B	FO2403								
HADCWAV	*J2116	49	23A	FO1505	J2113	47	25B	FO1505				
HADCWO	J2146	48	22A	FO1401	J2116	47	24A	FO1505	*J2115	51	FO15	FO1505
	*J2115	51	27B	FO2403								
HADCXAV	*J2116	56	28B	FO1505	J2113	68	32A	FO1505				
HADCXO	J2145	71	35B	FO1401	J2116	55	29B	FO1505	*J2115	66	31A	FO1505
	*J2115	66	31A	FO2403								
HADCYAV	*J2116	57	30B	FO1505	J2113	62	29A	FO1505				
HADCYO	J2145	69	34B	FO1401	J2116	59	31B	FO1505	*J2115	60	28A	FO1505

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	*J2115	60	28A	FO2403								
HADCZAV	*J2116	68	32B	FO1506	J2113	53	28B	FO1506				
HADCZO	J2116	65	33B	FO1506	*J2115	57	30B	FO1506	*J2115	57	30B	FO2403
	J2145	70	34A	FO1401								
HADDAAV	*J2116	80	38B	FO1506	J2113	59	31B	FO1506				
HADDAO	J2116	79	39B	FO1506	*J2115	63	33B	FO1506	*J2115	63	33B	FO2403
	J2145	72	35A	FO1401								
HADDBAV	*J2116	71	36B	FO1506	J2113	77	38B	FO1506				
HADDBO	J2146	71	35B	FO1401	J2116	73	37B	FO1506	*J2115	75	37B	FO1506
	*J2115	75	37B	FO2403								
HADDCAV	*J2116	70	34B	FO1506	J2113	71	36A	FO1506				
HADDCO	J2146	69	34B	FO1401	J2116	69	35B	FO1506	*J2115	72	34A	FO1506
	*J2115	72	34A	FO2403								
HADDDAV	*J2116	72	34A	FO1506	J2113	65	34B	FO1506				
HADDDO	J2146	70	34A	FO1401	J2116	74	35A	FO1506	*J2115	69	35A	FO1506
	*J2115	69	35A	FO2403								
HADDEAV	*J2116	78	36A	FO1506	J2113	76	37A	FO1506				
HADDEO	J2146	72	35A	FO1401	J2116	76	37A	FO1506	*J2115	80	39A	FO1506
	*J2115	80	39A	FO2403								
HADEAOV	J2118	77	38B	FO1000	J2118	63	32B	FO1000	J2118	49	26B	FO1000
	J2118	37	18B	FO1000	J2118	23	12B	FO1000	J2118	09	06B	FO1000
	*J2124	13	06A	FO1000								
HADEBOV	J2120	77	38B	FO1000	J2120	63	32B	FO1000	J2120	49	26B	FO1000
	J2120	37	18B	FO1000	J2120	23	12B	FO1000	J2120	09	06B	FO1000
	*J2124	08	04A	FO1000								
HADECOV	J2119	77	38B	FO1000	J2119	63	32B	FO1000	J2119	49	26B	FO1000
	J2119	37	18B	FO1000	J2119	23	12B	FO1000	J2119	09	06B	FO1000
	*J2124	03	03A	FO1000								
HADXYAV	J2119	74	36A	FO1000	J2118	74	36A	FO1000	J2118	62	30A	FO1000
	J2119	62	30A	FO1000	J2119	50	23A	FO1000	J2118	50	23A	FO1000
	J2118	36	17A	FO1000	J2118	22	11A	FO1000	J2118	08	04A	FO1000
	*J2124	01	02B	FO1000								
HADXZAV	J2120	74	36A	FO1000	J2120	62	30A	FO1000	J2120	50	23A	FO1000
	J2120	36	17A	FO1000	J2119	36	17A	FO1000	J2119	22	11A	FO1000
	J2120	22	11A	FO1000	J2120	08	04A	FO1000	J2119	08	04A	FO1000
	*J2124	07	04B	FO1000								

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution							
HAD010E	*J2120	07	05B	FO1000	J2109	08	06A	FO1501
HAD011E	*J2120	11	07B	FO1000	J2108	04	02A	FO1501
HAD012E	*J2120	13	07A	FO1000	J2117	06	05A	FO1501
HAD013E	*J2120	10	05A	FO1000	J2108	22	14A	FO1501
HAD020E	*J2120	21	11B	FO1000	J2109	03	02A	FO1501
HAD021E	*J2120	27	13B	FO1000	J2106	40	19A	FO1501
HAD022E	*J2120	25	14A	FO1000	J2117	29	14B	FO1502
HAD023E	*J2120	24	12A	FO1000	J2117	35	17B	FO1502
HAD030E	*J2120	35	17B	FO1000	J2108	38	20A	FO1502
HAD031E	*J2120	39	19B	FO1000	J2108	61	31A	FO1502
HAD032E	*J2120	42	20A	FO1000	J2117	52	24A	FO1502
HAD033E	*J2120	38	18A	FO1000	J2109	23	11B	FO1502
HAD040E	*J2120	47	25B	FO1000	J2109	41	22B	FO1501
HAD041E	J2109	31	15B	FO1501	*J2120	51	27B	FO1000
HAD042E	J2135	49	26B	FO1501	*J2120	56	26A	FO1000
HAD043E	*J2120	52	24A	FO1000	J2108	59	31B	FO1501
HAD050E	*J2120	61	31B	FO1000	J2106	18	10A	FO1501
HAD051E	*J2120	65	33B	FO1000	J2117	41	22B	FO1501
HAD052E	*J2120	68	33A	FO1000	J2135	14	09A	FO1502
HAD053E	*J2120	64	31A	FO1000	J2106	59	31B	FO1502
HAD060E	*J2120	75	37B	FO1000	J2108	76	37A	FO1502
HAD061E	*J2120	79	39B	FO1000	J2108	75	39A	FO1502
HAD062E	*J2120	80	39A	FO1000	J2109	71	36A	FO1502
HAD063E	*J2120	76	37A	FO1000	J2106	76	37A	FO1502
HAD070E	*J2119	07	05B	FO1000	J2114	08	06A	FO1503
HAD071E	*J2119	11	07B	FO1000	J2112	21	11B	FO1503
HAD072E	*J2119	13	07A	FO1000	J2117	01	02B	FO1503
HAD073E	*J2119	10	05A	FO1000	J2112	27	13B	FO1503
HAD080E	*J2119	21	11B	FO1000	J2106	17	08B	FO1503
HAD081E	*J2119	27	13B	FO1000	J2114	04	04A	FO1503
HAD082E	*J2119	25	14A	FO1000	J2114	03	02A	FO1504
HAD083E	*J2119	24	12A	FO1000	J2114	24	13A	FO1504
HAD090E	*J2119	35	17B	FO1000	J2106	55	29B	FO1504
HAD091E	*J2119	39	19B	FO1000	J2114	18	10A	FO1504
HAD092E	J2119	42	20A	FO1000	J2114	17	08B	FO1504
HAD093E	*J2119	38	18A	FO1000	J2114	59	31B	FO1504

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution							
HAD100E	*J2118	07	05B	FO1000	J2114	23	11B	FO1503
HAD101E	*J2118	11	07B	FO1000	J2112	51	27B	FO1503
HAD102E	*J2118	13	07A	FO1000	J2117	45	24B	FO1503
HAD103E	*J2118	10	05A	FO1000	J2112	64	33A	FO1503
HAD110E	*J2118	21	11B	FO1000	J2106	24	13A	FO1503
HAD111E	*J2118	27	13B	FO1000	J2114	68	32A	FO1503
HAD112E	*J2118	25	14A	FO1000	J2114	62	29A	FO1504
HAD113E	*J2118	24	12A	FO1000	J2114	53	28B	FO1504
HAD120E	*J2118	35	17B	FO1000	J2112	62	29A	FO1504
HAD121E	*J2118	39	19B	FO1000	J2114	77	38B	FO1504
HAD122E	*J2118	42	20A	FO1000	J2114	71	36A	FO1504
HAD123E	*J2118	38	18A	FO1000	J2109	65	34B	FO1504
HAD130E	*J2118	47	25B	FO1000	J2114	11	05B	FO1505
HAD131E	*J2118	51	27B	FO1000	J2114	40	19A	FO1505
HAD132E	*J2118	56	26A	FO1000	J2117	09	04B	FO1505
HAD133E	*J2118	52	24A	FO1000	J2116	23	12A	FO1505
HAD140E	*J2118	61	31B	FO1000	J2106	23	11B	FO1505
HAD141E	*J2118	65	33B	FO1000	J2114	34	16A	FO1505
HAD142E	*J2118	68	33A	FO1000	J2114	29	14B	FO1506
HAD143E	*J2118	64	31A	FO1000	J2114	35	17B	FO1506
HAD150E	*J2118	75	37B	FO1000	J2116	17	09B	FO1506
HAD151E	*J2118	79	39B	FO1000	J2116	21	11B	FO1506
HAD152E	*J2118	80	39A	FO1000	J2114	54	25A	FO1506
HAD153E	*J2118	76	37A	FO1000	J2109	42	20A	FO1506
HAD160E	*J2119	47	25B	FO1000	J2114	48	22A	FO1505
HAD161E	*J2119	51	27B	FO1000	J2114	41	22B	FO1505
HAD162E	*J2119	56	26A	FO1000	J2117	38	18A	FO1505
HAD163E	*J2119	52	24A	FO1000	J2116	41	23B	FO1505
HAD170E	*J2119	61	31B	FO1000	J2116	45	25B	FO1505
HAD171E	*J2119	65	33B	FO1000	J2114	47	25B	FO1505
HAD172E	*J2119	68	33A	FO1000	J2114	65	34B	FO1506
HAD173E	*J2119	64	31A	FO1000	J2114	76	37A	FO1506
HAD180E	*J2119	75	37B	FO1000	J2106	35	17B	FO1506
HAD181E	*J2119	79	39B	FO1000	J2116	64	33A	FO1506
HAD182E	*J2119	80	39A	FO1000	J2109	78	38A	FO1506
HAD183E	*J2119	76	37A	FO1000	J2116	61	31A	FO1506

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAEBCA	*J2143	57	30B	FO0500	J2141	75	39A	FO0500				
HAEBCOV	*J2141	77	38A	FO0500	J2138	73	36B	FO0500				
HAEBDA	*J2138	72	34A	FO0500	J2135	77	38B	FO0500				
HAECMOV	J2130	21		FO0601	J2130	23		FO0601	J2133	23		FO0602
	J2133	21		FO0603	J2137	21		FO0604	J2137	23		FO0604
	J2137	45		FO0605	*J2136	48	21A	FO0300	J2137	47		FO0604
	J2137	63		FO0604	J2137	65		FO0605	J2133	65		FO0602
	J2133	63		FO0602	J2133	47		FO0603	J2133	45		FO0603
	J2130	45		FO0601	J2130	47		FO0601	J2130	63		FO0601
	J2130	65		FO0601								
HAENAR	*J2135	69	35A	FO0500	J2134	61	32B	FO0500				
HAENAS	J2144	20	11A	FO0500	J2144	38	18A	FO0500	J2143	68	32A	FO0500
	J2143	64	30A	FO0500	J2139	50	24A	FO0300	J2139	63	31A	FO0300
	J2138	79	39B	FO0500	J2135	71	36A	FO0500	*J2134	63	33B	FO0500
HAENDO	*J2135	59	31B	FO0500	J2117	69	35A	FO0500				
HAENER	*J2138	75	37B	FO0500	J2135	79	39B	FO0500	J2101	75		FO0500
HAENES	J2144	34	16A	FO0500	J2138	77	38B	FO0500	*J2135	76	37A	FO0500
HAENRAV	J2144	04	04A	FO0500	J2144	06	05A	FO0500	J2144	22	12A	FO0500
	*J2141	14	08B	FO0500								
HAENRO	*J2143	66	31A	FO0500	J2141	17	09B	FO0500				
HAEN1A	J2124	38	20A	FO0601	J2124	27	13B	FO0601	*J2135	23	11B	FO0500
	J2141	64	33A	FO0500								
HAEN1OV	J2126	31	15B	FO0601	J2126	37	18B	FO0601	J2126	36	17A	FO0601
	J2126	42	20A	FO0601	J2131	48	22A	FO0601	J2138	74	35B	FO0300
	*J2141	66	32A	FO0500								
HAEN2A	J2131	47	25B	FO0601	J2131	56	26A	FO0602	J2141	61	31A	FO0500
	*J2143	14	09A	FO0500								
HAEN2OV	J2134	04	04A	FO0601	J2131	41	22B	FO0602	*J2141	63	30A	FO0500
HAEN3A	*J2143	21	10B	FO0500	J2141	62	29A	FO0500	J2138	70	33A	FO0602
HAEN3OV	*J2141	60	28A	FO0500	J2134	62	29A	FO0602	J2134	03	02A	FO0603
HAEN4A	*J2143	27	13B	FO0500	J2141	55	29B	FO0500	J2134	70	33A	FO0603
HAEN4OV	J2138	62	29A	FO0604	*J2141	56	28B	FO0500	J2134	53	28B	FO0603
HAEN5A	*J2143	38	18A	FO0500	J2141	59	31B	FO0500	J2134	77	38B	FO0604
HAEN5OV	J2143	59	31B	FO0604	*J2141	57	30B	FO0500	J2134	71	36A	FO0604
	J2117	71	36A	FO0500								
HAEN6A	*J2143	30	15A	FO0500	J2141	65	33B	FO0500	J2138	53	28B	FO0605

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution								
HAEN6OV	J2117 78	38A	FO0500	J2134 65	34B	FO0604	*J2141 68	32B	FO0500
HAETCA	J2144 01	02B	FO0500	J2144 10	0.7A	FO0500	J2144 26	14A	FO0500
	*J2143 60	28A	FO0500						
HAET1P	*J2144 11	05B	FO0500	J2143 42	20A	FO0500	J2141 35	18A	FO0500
	J2135 24	13A	FO0500						
HAET1Q	*J2144 13	06B	FO0500	J2143 18	10A	FO0500	J2143 23	11b	FO0500
HAET1OV	J2144 05	03B	FO0500	*J2141 37	17A	FO0500			
HAET2P	*J2144 09	04B	FO0500	J2143 20	11A	FO0500	J2143 36	17A	FO0500
	J2141 36	16A	FO0500						
HAET2Q	*J2144 07	03A	FO0500	J2143 17	08B	FO0500	J2143 40	19A	FO0500
HAET2OV	J2144 24	13A	FO0500	*J2141 34	15A	FO0500			
HAET3P	*J2144 23	11B	FO0500	J2143 19	09B	FO0500	J2135 25	12B	FO0500
HAET3Q	J2143 34	16A	FO0500	*J2144 25	12B	FO0500	J2143 25	12B	FO0500
	J2141 29	15B	FO0500						
HAET3OV	J2144 08	06A	FO0500	J2144 14	09A	FO0500	J2144 42	20A	FO0500
	*J2141 30	14B	FO0500						
HAET4P	J2117 77	38B	FO0500	J2117 68	32A	FO0500	J2141 33	17B	FO0500
	*J2144 21	10B	FO0500						
HAET4Q	J2117 59	31B	FO0500	J2117 60	28A	FO0500	*J2144 19	09B	FO0500
HAET4OV	J2144 40	19A	FO0500	*J2141 31	16B	FO0500			
HAET5P	*J2144 35	17B	FO0500	J2117 62	29A	FO0500	J2117 70	33A	FO0500
HAET5Q	J2117 79	39B	FO0500	J2117 61	32B	FO0500	J2141 39	19B	FO0500
	*J2144 37	18B	FO0500						
HAET5OV	J2144 18	10A	FO0500	*J2141 42	18B	FO0500			
HAE1CA	J2135 61	32B	FO0500	*J2117 64	30A	FO0500			
HAE2CA	J2135 66	31A	FO0500	*J2117 55	29B	FO0500			
HAE3CA	J2135 68	32A	FO0500	*J2117 63	33B	FO0500			
HAE4CA	J2135 70	33A	FO0500	*J2117 73	36B	FO0500			
HAE5CA	J2143 70	33A	FO0500	J2135 75	37B	FO0500	*J2117 74	35B	FO0500
HAE6CA	J2135 78	38A	FO0500	*J2117 80	39A	FO0500			
HAFBAAV	J2139 35	16B	FO0300	J2139 49	24B	FO0300	*J2136 68	32B	FO2200
	J2135 72	34A	FO0500						
HAFTBP	*J2144 45	24B	FO0500	J2101 72		FO0500			
HAFTBQ	*J2144 43	23B	FO0500	J2101 70		FO0500			
HAFTCP	*J2144 33	16B	FO0500	J2135 73	36B	FO0500	J2112 55	29B	FO0500
HAFTCOV	J2144 48	22A	FO0500	*J2112 56	28B	FO0500	J2101 38		FO0500

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAGAAAV	J2126	10	07A	FO0601	J2126	05	03B	FO0601	J2126	07	03A	FO0601
	J2126	13	06B	FO0601	*J2124	26	12B	FO0601				
HAGABAV	J2126	19	09B	FO0601	J2126	20	11A	FO0601	J2126	26	14A	FO0601
	J2126	25	12B	FO0601	*J2124	40	19A	FO0601				
HAGACA	*J2131	46	21A	FO0601	J2117	22	12A	FO0601				
HAGADA	*J2131	45	24B	FO0601	J2117	24	13A	FO0601				
HAGAEO	J2126	64	30A	FO0601	J2126	55	29B	FO0602	*J2117	20	11A	FO0601
HAGAFO	*J2131	52	24A	FO0601	J2126	49	26B	FO0601	J2126	43	23B	FO0601
HAGAGO	J2126	78	38A	FO0602	J2126	79	39B	FO0602	J2126	73	36B	FO0602
	J2126	74	35B	FO0602	J2126	70	33A	FO0602	J2126	56	26A	FO0602
	J2126	61	32B	FO0602	J2126	50	23A	FO0602	*J2131	51	27B	FO0602
HAGAHA	*J2134	01	02B	FO0602	J2117	14	09A	FO0602				
HAGAIA	*J2134	09	04B	FO0602	J2117	17	08B	FO0602				
HAGAJO	J2131	20	11A	FO0602	J2131	19	09B	FO0602	J2131	25	12B	FO0602
	J2131	26	14A	FO0602	*J2117	19	09B	FO0602				
HAGAKO	*J2138	66	31A	FO0602	J2134	25	12B	FO0603	J2134	26	14A	FO0603
	J2134	20	11A	FO0603	J2134	19	09B	FO0603	J2131	10	07A	FO0603
	J2131	05	03B	FO0602	J2131	07	03A	FO0602	J2131	13	06B	FO0602
HAGALA	*J2134	60	28A	FO0603	J2117	21	10B	FO0603				
HAGAMA	*J2134	57	30B	FO0603	J2117	23	11B	FO0603				
HAGANO	J2131	70	33A	FO0603	J2131	64	30A	FO0603	J2131	61	32B	FO0603
	J2131	55	29B	FO0603	J2131	37	18B	FO0603	J2131	31	15B	FO0603
	*J2117	27	13B	FO0603								
HAGAPO	J2131	79	39B	FO0603	J2131	78	38A	FO0603	J2131	74	35B	FO0603
	J2131	73	36B	FO0603	J2131	42	20A	FO0603	J2131	36	17A	FO0603
	*J2134	66	31A	FO0603								
HAGAQA	J2143	63	33B	FO0604	J2135	10	07A	FO0604				
HAGARA	*J2138	60	28A	FO0604	J2135	13	06B	FO0604				
HAGASO	J2138	03	02A	FO0604	J2138	36	17A	FO0604	J2138	42	20A	FO0604
	J2138	11	05B	FO0604	J2138	19	09B	FO0604	J2138	20	11A	FO0604
	J2138	26	14A	FO0604	J2138	25	12B	FO0604	*J2135	11	05B	FO0604
HAGATO	J2138	31	15B	FO0604	J2138	37	18B	FO0604	J2138	04	04A	FO0604
	J2138	08	06A	FO0604	*J2134	75	37B	FO0604				
HAGAUA	J2135	30	15A	FO0604	J2135	37	18B	FO0604	*J2134	72	34A	FO0604
HAGAVA	J2135	31	15B	FO0604	J2135	38	18A	FO0604	*J2134	69	35A	FO0604
HAGAWO	J2134	43	23B	FO0605	J2138	50	23A	FO0604	J2138	49	26B	FO0604

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution											
	J2138	43	23B	FO0604	*J2135	35	17B	FO0604				
HAGAXO	J2134	37	18B	FO0604	J2134	31	15B	FO0605	*J2135	33	16B	FO0604
	J2134	36	17A	FO0605	J2134	42	20A	FO0605	J2134	50	23A	FO0605
	J2134	56	26A	FO0605								
HAGAYO	*J2138	57	30B	FO0605	*J2138	57	30B	FO0604	J2134	49	26B	FO0605
	J2134	78	38A	FO0605								
HAGA11V1	*J2130	15	T01	FO0601	J2129	05		FO0601	J2126	08	06A	FO0601
HAGA12V1	*J2130	18	T02	FO0601	J2129	06		FO0601	J2126	04	04A	FO0601
HAGA13V1	*J2130	20	T03	FO0601	J2129	07		FO0601	J2126	03	02A	FO0601
HAGA14V1	*J2130	22	T04	FO0601	J2129	08		FO0601	J2126	11	05B	FO0601
HAGA15V1	J2129	09		FO0601	*J2130	24	T05	FO0601	J2126	24	13A	FO0601
HAGA16V1	*J2130	26	T06	FO0601	J2129	10		FO0601	J2126	18	10A	FO0601
HAGA17V1	*J2130	29	T07	FO0601	J2129	17		FO0601	J2126	17	08B	FO0601
HAGA15V1	*J2130	34	T08	FO0601	J2129	18		FO0601	J2126	23	11B	FO0601
HAGA21V1	J2129	19		FO0601	*J2130	38	T09	FO0601	J2126	40	19A	FO0601
HAGA22V1	J2129	20		FO0601	*J2130	40	T10	FO0601	J2126	34	16A	FO0601
HAGA23V1	*J2130	42	T11	FO0601	J2129	24		FO0601	J2126	29	14B	FO0601
HAGA24V1	*J2130	46	T12	FO0601	J2129	26		FO0601	J2126	35	17B	FO0601
HAGA25V1	J2129	23		FO0601	*J2130	48	T13	FO0601	J2126	54	25A	FO0601
HAGA26V1	J2129	25		FO0601	*J2130	50	T14	FO0601	J2126	48	22A	FO0601
HAGA27V1	*J2130	52	T15	FO0601	J2129	29		FO0601	J2126	41	22B	FO0601
HAGA28V1	J2129	30		FO0601	*J2130	54	T16	FO0601	J2126	47	25B	FO0601
HAGA31V1	J2129	38		FO0602	*J2130	62	T17	FO0602	J2126	68	32A	FO0602
HAGA32V1	J2129	36		FO0602	*J2130	64	T18	FO0602	J2126	62	29A	FO0602
HAGA33V1	*J2130	66	T19	FO0602	J2129	35		FO0602	J2126	53	28B	FO0602
HAGA34V1	J2129	37		FO0602	*J2130	68	T21	FO0602	J2126	59	31B	FO0602

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAGA35V1	J2129	39		FO0602	*J2130	70	T20	FO0602	J2126	77	38B	FO0602
HAGA36V1	J2129	40		FO0602	*J2130	72	T22	FO0602	J2126	71	36A	FO0602
HAGA37V1	J2129	42		FO0602	*J2130	74	T23	FO0602	J2126	65	34B	FO0602
HAGA38V1	J2129	46		FO0602	*J2130	76	T24	FO0602	J2126	76	37A	FO0602
HAGA41V1	*J2133	15	T01	FO0602	J2132	19		FO0602	J2131	08	06A	FO0602
HAGA42V1	*J2133	18	T02	FO0602	J2132	20		FO0602	J2131	04	04A	FO0602
HAGA43V1	*J2133	20	T03	FO0602	J2132	24		FO0602	J2131	03	02A	FO0602
HAGA44V1	*J2133	22	T04	FO0602	J2132	26		FO0602	J2131	11	05B	FO0602
HAGA45V1	*J2133	24	T05	FO0602	J2132	23		FO0602	J2131	24	13A	FO0602
HAGA46V1	*J2133	26	T06	FO0602	J2132	25		FO0602	J2131	18	10A	FO0602
HAGA47V1	*J2133	29	T07	FO0602	J2132	29		FO0602	J2131	17	08B	FO0602
HAGA48V1	*J2133	34	T08	FO0602	J2132	30		FO0602	J2131	23	11B	FO0602
HAGA51V1	J2132	38		FO0603	*J2133	38	T09	FO0603	J2134	24	13A	FO0603
HAGA52V1	J2132	36		FO0603	*J2133	40	T10	FO0603	J2134	18	10A	FO0603
HAGA53V1	J2132	35		FO0603	*J2133	42	T11	FO0603	J2134	17	08B	FO0603
HAGA54V1	J2132	37		FO0603	*J2133	46	T12	FO0603	J2134	23	11B	FO0603
HAGA55V1	*J2133	48	T13	FO0603	J2132	39		FO0603	J2131	40	19A	FO0603
HAGA56V1	*J2133	50	T14	FO0603	J2132	40		FO0603	J2131	34	16A	FO0603
HAGA57V1	*J2133	52	T15	FO0603	J2132	42		FO0603	J2131	29	14B	FO0603
HAGA58V1	*J2133	54	T16	FO0603	J2132	46		FO0603	J2131	35	17B	FO0603
HAGA61V1	*J2133	62	T17	FO0603	J2131	68	32A	FO0603	J2129	41		FO0603
HAGA62V1	*J2133	64	T18	FO0603	J2131	62	29A	FO0603	J2129	45		FO0603
HAGA63V1	J2129	47		FO0603	J2131	53	28B	FO0603	*J2133	66	T19	FO0603
HAGA64V1	J2129	48		FO0603	J2131	59	31B	FO0603	*J2133	68	T21	FO0603
HAGA65V1	*J2133	70	T20	FO0603	J2131	77	38B	FO0603	J2129	52		FO0603
HAGA66V1	*J2133	72	T22	FO0603	J2131	71	36A	FO0603	J2129	54		FO0603
HAGA67V1	*J2133	74	T23	FO0603	J2131	65	34B	FO0603	J2129	51		FO0603
HAGA68VI	*J2133	76	T24	FO0603	J2131	76	37A	FO0603	J2129	53		FO0603
HAGA71V1	J2138	10	07A	FO0604	*J2137	15	T01	FO0604	J2132	41		FO0604
HAGA72V1	J2138	05	03B	FO0604	*J2137	18	T02	FO0604	J2132	45		FO0604
HAGA73V1	J2138	07	03A	FO0604	*J2137	20	T03	FO0604	J2132	47		FO0604
HAGA74V1	J2138	13	06B	FO0604	*J2137	22	T04	FO0604	J2132	48		FO0604
HAGA75V1	J2138	24	13A	FO0604	*J2137	24	T05	FO0604	J2132	52		FO0604
HAGA76V1	J2138	18	10A	FO0604	*J2137	26	T06	FO0604	J2132	54		FO0604
HAGA77V1	J2138	17	08B	FO0604	*J2137	29	T07	FO0604	J2132	51		FO0604
HAGA78V1	J2138	23	11B	FO0604	*J2137	34	T08	FO0604	J2132	53		FO0604
HAGA81V1	J2138	40	19A	FO0604	*J2137	38	T09	FO0604	J2132	55		FO0604

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAGA82V1	J2138	34	16A	FO0604	*J2137	40	T10	FO0604	J2132	56		FO0604
HAGA83V1	J2138	29	14B	FO0604	*J2137	42	T10	FO0604	J2132	62		FO0604
HAGA84V1	J2128	35	17B	FO0604	*J2137	46	T12	FO0604	J2132	64		FO0604
HAGA85V1	J2132	61		FO0604	J2134	76	37A	FO0604	*J2137	48	T13	FO0604
HAGA86V1	J2138	48	22A	FO0604	*J2137	50	T14	FO0604	J2132	63		FO0604
HAGA87V1	J2138	41	22B	FO0604	*J2137	52	T15	FO0604	J2132	65		FO0604
HAGA88V1	J2138	47	25B	FO0604	*J2137	54	T16	FO0604	J2132	66		FO0604
HAGA91V1	J2132	72		FO0605	*J2137	62	T17	FO0605	J2134	40	19A	FO0605
HAGA92V1	J2132	74		FO0605	*J2137	64	T18	FO0605	J2134	34	16A	FO0605
HAGA93V1	*J2137	66	T19	FO0605	J2132	71		FO0605	J2134	29	14B	FO0605
HAGA94V1	*J2137	68	T21	FO0605	J2132	73		FO0605	J2134	35	17B	FO0605
HAGA95V1	*J2137	70	T20	FO0605	J2134	54	25A	FO0605	J2132	75		FO0605
HAGA96V1	*J2137	72	T22	FO0605	J2132	76		FO0605	J2134	48	22A	FO0605
HAGA97V1	*J2137	74	T23	FO0605	J2132	77		FO0605	J2134	41	22B	FO0605
HAGA98V1	*J2137	76	T24	FO0605	J2132	78		FO0605	J2134	47	25B	FO0605
HAGMA3A	*J2109	39	19B	FO0605	J2116	75	39A	FO1507				
HAGM30V	*J2116	77	38A	FO1507	J2140	78	38A	FO1507				
HAGN50V	*J2141	80	38B	FO2300	J2139	57	29B		J2139	03	02B	FO0300
HAGN60V	J2147	05	04B	FO1401	*J2141	71	36B		J2139	59	30B	FO0300
HAG01A	*J2126	06	05A	FO0601	J2124	35	18A	FO0601				
HAG01OV	*J2124	37	17A	FO0601	J2106	10	07A	FO1501	J2104	01		FO0601
HAG02A	*J2126	01	02B	FO0601	J2124	36	16A	FO0601				
HAGO20V	*J2124	34	15A	FO0601	J2106	05	03B	FO1501	J2104	03		FO0601
HAG03A	*J2126	09	04B	FO0601	J2124	29	15B					
HAG030V	*J2124	30	14B	FO0601	J2106	07	03A	FO1501	J2104	04		FO0601
HAG04A	*J2126	15	07B	FO0601	J2124	33	17B					
HAG04OV	J2140	60	28A		*J2124	31	16B	FO0601	J2109	05	03B	FO1501
	J2104	05		FO0601								
HAGO5A	*J2126	22	12A	FO0601	J2124	39	19B	FO0601				
HAGO5OV	*J2124	42	18B	FO0601	J2106	13	06B	FO1501	J2104	06		FO0601
HAG06A	*J2126	14	09A	FO0601	J2124	52	26A	FO0601				
HAG06OV	*J2124	54	25A	FO0601	J2109	13	06B	FO1501	J2104	07		FO0601
HAG07A	*J2126	21	10B	FO0601	J2124	47	24A	FO0601				
HAG07OV	*J2124	49	23A	FO0601	J2109	26	14A	FO1502	J2104	08		FO0601
HAG08A	*J2126	27	13B	FO0601	J2124	50	22A	FO0601				
HAG08OV	J2140	10	07A	FO1507	*J2124	48	21A	FO0601	J2109	20	11A	FO1502

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup -Continued

Signal	Distribution											
	J2104	09		FO0601								
HAG09A	*J2126	38	18A	FO0601	J2124	41	23B	FO0601				
HAGO9OV	*J2124	46	22B	FO0601	J2109	19	09B	FO1502	J2104	10		FO0601
HAG1OA	*J2126	30	15A	FO0601	J2124	45	25B	FO0601				
HAG1OOV	*J2124	43	24B	FO0601	J2106	56	26A	FO1502	J2104	11		FO0601
HAG11A	*J2126	33	16B	FO0601	J2124	51	27B	FO0601				
HAG11OV	*J2124	53	26B	FO0601	J2106	50	23A	FO1502	J2104	13		FO0601
HAG12A	*J2126	39	19B	FO0601	J2124	64	33A	FO0601				
HAG12OV	*J2124	66	32A	FO0601	J2106	43	23B	FO1502	J2104	14		FO0601
HAG13A	*J2126	52	24A	FO0601	J2124	61	31A	FO0601				
HAG13OV	*J2124	63	30A	FO0601	J2106	70	33A	FO1501	J2104	15		FO0601
HAG14A	*J2126	46	21A	FO0601	J2124	62	29A	FO0601				
HAG14OV	J2140	05	03B	FO1507	*J2124	60	28A	FO0601	J2106	64	30A	FO1501
	J2104	17		FO0601								
HAG15A	*J2126	45	24B	FO0601	J2124	55	29B	FO0601				
HAG15OV	J2140	59	31B	FO1507	*J2124	56	28B	FO0601	J2109	56	26A	FO1501
	J2104	18		FO0601								
HAG16A	*J2126	51	27B	FO0601	J2124	59	31B	FO0601				
HAG16OV	*J2124	57	30B	FO0601	J2109	50	23A	FO1501	J2104	19		FO0601
HAG17A	*J2126	66	31A	FO0602	J2124	65	33B	FO0602				
HAG17OV	J2140	09	04B	FO1507	*J2124	68	32B	FO0602	J2109	70	33A	FO1501
	J2104	20		FO0602								
HAG18A	*J2126	60	28A	FO0602	J2124	79	39B	FO0602				
HAG18OV	*J2124	80	38B	FO0602	J2109	64	30A	FO1501	J2104	21		FO0602
HAG19A	*J2126	57	30B	FO0602	J2124	73	37B	FO0602				
HAG19OV	*J2124	71	36B	FO0602	J2109	55	29B	FO1502	J2104	22		FO0602
HAG2OA	*J2126	63	33B	FO0602	J2124	69	35B	FO0602				
HAG200V	*J2124	70	34B	FO0602	J2109	61	32B	FO1502	J2104	23		FO0602
HAG21A	*J2126	75	37B	FO0602	J2124	74	35A	FO0602				
HAG21OV	*J2124	72	34A	FO0602	J2106	79	39B	FO1502	J2104	24		FO0602
HAG22A	*J2126	72	34A	FO0602	J2124	76	37A	FO0602				
HAG22OV	*J2124	78	36A	FO0602	J2106	73	36B	FO1502	J2104	25		FO0602
HAG23A	*J2126	69	35A	FO0602	J2124	75	39A	FO0602				
HAG23OV	*J2124	77	38A	FO0602	J2106	74	35B	FO1502	J2104	26		FO0602
HAG24A	J2128	75	39A	FO0602	*J2126	80	39A	FO0602				

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAG240V	*J2128	77	38A	FO0602	J2109	79	39B	FO1502	J2104	27		FO0602
HAG25A	*J2131	06	05A	FO0602	J2128	22	14A	FO0602				
HAG250V	*J2128	24	13A	FO0602	J2111	10	07A	FO1503	J2104	29		FO0602
HAG26A	*J2131	01	02B	FO0602	J2128	23	12A	FO0602				
HAG260V	J2140	77	38B	FO1507	*J2128	25	11A	FO0602	J2111	05	03B	FO1507
	J2104	30		FO0602								
HAG27A	*J2131	09	04B	FO0602	J2128	20	10A	FO0602				
HAG270V	*J2128	18	09A	FO0602	J2111	07	03A	FO1503	J2104	31		FO0602
HAG28A	*J2131	15	07B	FO0602	J2128	17	09B	FO0602				
HAG28OV	*J2128	14	08B	FO0602	J2111	13	06B	FO1503	J2104	33		FO0602
HAG29A	*J2131	22	12A	FO0602	J2128	21	11B	FO0602				
HAG290V	J2140	26	14A	FO1507	*J2128	19	10B	FO0602	J2111	26	14A	FO1503
	J2104	34		FO0602								
HAG30A	*J2131	14	09A	FO0602	J2128	27	13B	FO0602				
HAG300V	*J2128	26	12B	FO0602	J2111	20	11A	FO1503	J2104	35		FO0602
HAG31A	*J2131	21	10B	FO0602	J2128	38	20A	FO0602				
HAG310V	*J2128	40	19A	FO0602	J2111	19	09B	FO1504	J2104	36		FO0602
HAG32A	*J2131	27	13B	FO0602	J2128	35	18A	FO0602				
HAG320V	*J2128	37	17A	FO0602	J2111	25	12B	FO1504	J2104	37		FO0602
HAG33A	*J2134	22	12A	FO0603	J2128	36	16A	FO0603				
HAG330V	*J2128	34	15A	FO0603	J2111	42	20A	FO1504	J2104	38		FO0603
HAG34A	*J2134	14	09A	FO0603	J2128	29	15B	FO0603				
HAG340V	J2140	18	10A	FO1507	*J2128	30	14B	FO0603	J2111	36	17A	FO1504
	J2104	39		FO0603								
HAG35A	*J2134	21	10B	FO0603	J2128	33	17B	FO0603				
HAG350V	*J2128	31	16B	FO0603	J2111	31	15B	FO1504	J2104	40		FO0603
HAG36A	*J2134	27	13B	FO0603	J2128	39	19B	FO0603				
HAG360V	*J2128	42	18B	FO0603	J2111	37	18B	FO1504	J2104	41		FO0603
HAG37A	*J2131	38	18A	FO0603	J2128	52	26A	FO0603				
HAG370V	*J2128	54	25A	FO0603	J2111	56	26A	FO1503	J2104	42		FO0603
HAG38A	*J2131	20	15A	FO0603	J2128	47	24A	FO0603				
HAG380V	*J2128	49	23A	FO0603	J2111	50	23A	FO1503	J2104	43		FO0603
HAG39A	*J2131	33	16B	FO0603	J3128	50	22A	FO0603				
HAG390V	*J2128	48	21A	FO0603	J2111	43	23B	FO1503	J2104	45		FO0603
HAG40A	*J2131	39	19B	FO0603	J2128	41	23B	FO0603				
HAG400V	*J2128	46	22B	FO0603	J2111	49	26B	FO1503	J2104	46		FO0603

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAG41A	*J2131	66	31A	FO0603	J2128	45	25B	FO0603				
HAG410V	J2140	21	10B	FO1507	*J2128	43	24B	FO0603	J2111	70	33A	FO1503
	J2104	47		FO0603								
HAG42A	*J2131	60	28A	FO0603	J2128	51	27B	FO0603				
HAG420V	*J2128	53	26B	FO0603	J2111	64	30A	FO1503	J2104	48		FO0603
HAG43A	*J2131	57	30B	FO0603	J2128	64	33A	FO0603				
HAG430V	*J2128	66	32A	FO0603	J2111	55	29B	FO1504	J2104	49		FO0603
HAG44A	*J2131	63	33B	FO0603	J2128	61	31A	FO0603				
HAG440V	*J2128	63	30A	FO0603	J2111	61	32B	FO1504	J2104	50		FO0603
HAG45A	*J2131	75	37B	FO0603	J2128	62	29A	FO0603				
HAG450V	*J2128	60	28A	FO0603	J2111	79	39B	FO1504	J2104	51		FO0603
HAG46A	*J2131	72	34A	FO0603	J2128	55	29B	FO0603				
HAG460V	J2140	42	20A	FO1507	*J2128	56	28B	FO0603	J2111	73	36B	FO1504
	J2104	52		FO0603								
HAG47A	*J2131	69	35A	FO0603	J2128	59	31B	FO0603				
HAG470V	*J2128	57	30B	FO0603	J2111	74	35B	FO1504	J2104	53		FO0603
HAG48A	*J2131	80	39A	FO0603	J2128	65	33B	FO0603				
HAG480V	J2140	72	34A	FO1507	*J2128	68	32B	FO0603	J2111	78	38A	FO1504
	J2104	54		FO0603								
HAG49A	*J2138	06	05A	FO0604	J2128	79	39B	FO0604				
HAG490V	*J2128	80	38B	FO0604	J2115	10	07A	FO1505	J2104	55		FO0604
HAG50A	*J2138	01	02B	FO0604	J2128	73	37B	FO0604				
HAG500V	J2140	34	16A	FO1507	*J2128	71	36B	FO0604	J2115	05	03B	FO1505
	J2104	56		FO0604								
HAG51A	J2138	09	04B	FO0604	J2128	69	35B	FO0604				
HAG510V	*J2128	70	34B	FO0604	J2115	07	03A	FO1505	J2104	57		FO0604
HAG52A	*J2138	15	07B	FO0604	J2128	74	35A	FO0604				
HAG520V	*J2128	72	34A	FO0604	J2115	13	06B	FO1505	J2104	59		FO0604
HAG53A	*J2138	22	12A	FO0604	J2128	76	37A	FO0604				
HAG530V	J2140	33	16B	FO1507	*J2128	78	36A	FO0604	J2115	26	14A	FO1505
	J2104	60		FO0604								
HAG54A	*J2138	14	09A	FO0604	J2136	11	07A	FO0604				
HAG540V	*J2136	13	06A	FO0604	J2115	20	11A	FO1505	J2104	61		FO0604
HAG55A	*J2138	21	10B	FO0604	J2136	06	05A	FO0604				
HAG550V	*J2136	08	04A	FO0604	J2115	19	09B	FO1506	J2104	62		FO0604
HAG56A	*J2138	27	13B	FO0604	J2136	04	02A	FO0604				

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution										
HAG560V	*J2136	03	03A	FO0604	J2115	25	12B	FO1506	J2104	63	FO0604
HAG57A	*J2138	38	18A	FO0604	J2136	05	03B	FO0604			
HAG570V	*J2136	01	02B	FO0604	J2115	42	20A	FO1506	J2104	64	FO0604
HAG58A	*J2138	30	15A	FO0604	J2136	09	05B	FO0604			
HAG580V	*J2136	07	04B	FO0604	J2115	36	17A	FO1506	J2104	65	FO0604
HAG59A	*J2138	33	16B	FO0604	J2136	15	07B	FO0604			
HAG590V	*J2136	10	06B	FO0604	J2115	31	15B	FO1506	J2104	66	FO0604
HAG60A	*J2138	39	19B	FO0604	J2136	22	14A	FO0604			
HAG600V	*J2136	24	13A	FO0604	J2115	37	18B	FO1506	J2104	68	FO0604
HAG61A	*J2134	80	39A	FO0604	J2136	23	12A	FO0604			
HAG610V	*J2136	25	11A	FO0604	J2115	56	26A	FO1505	J2104	69	FO0604
	J2106	49	26B	FO0604							
HAG62A	*J2138	46	21A	FO0604	J2136	20	10A	FO0604			
HAG620V	*J2136	18	09A	FO0604	J2115	50	23A	FO1505	J2104	70	FO0604
HAG63A	*J2138	45	24B	FO0604	J2136	17	09B	FO0604			
HAG630V	*J2136	14	08B	FO0604	J2115	43	23B	FO1505	J2104	71	FO0604
HAG64A	*J2138	51	27B	FO0604	J2136	21	IB	FO0604			
HAG640V	*J2136	19	10B	FO0604	J2115	49	26B	FO1505	J2104	72	FO0604
HAG65A	J2136	27	13B	FO0605	*J2134	38	18A	FO0605			
HAG650V	*J2136	26	12B	FO0605	J2115	70	33A	FO1505	J2104	73	FO0605
	J2109	36	17A	FO0605							
HAG66A	J2136	38	20A	FO0605	*J2134	30	15A	FO0605			
HAG660V	*J2136	40	19A	FO0605	J2115	64	30A	FO1505	J2104	74	FO0605
	J2109	37	18B	FO0605							
HAG67A	J2136	35	18A	FO0605	*J2134	33	16B	FO0605			
HAG670V	*J2136	37	17A	FO0605	J2115	55	29B	FO1506	J2104	75	FO0605
HAG68A	J2136	36	16A	FO0605	*J2134	39	19B	FO0605			
HAG680V	*J2136	34	15A	FO0605	J2115	61	32B	FO1506	J2104	76	FO0605
HAG69A	J2136	29	15B	FO0605	*J2134	52	24A	FO0605			
HAG690V	J2140	56	26A	FO1507	*J2136	30	14B	FO0605	J2115	79 39B	FO1506
	J2104	77		FO0605							
HAG70A	J2136	33	17B	FO0605	*J2134	46	21A	FO0605			
HAG700V	*J2136	31	16B	FO0605	J2115	73	36B	FO1506	J2104	78	FO0605
HAG71A	J2136	39	19B	FO0605	*J2134	45	24B	FO0605			
HAG710V	*J2136	42	18B	FO0605	J2115	74	35B	FO1506	J2104	79	FO0605
HAG72A	J2136	52	26A	FO0605	*J2134	51	27B	FO0605			

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAG720V	*J2136	54	25A	FO0605	J2115	78	38A	FO1506	J2104	80		FO0605
	J2109	49	26B	FO0605								
HAHAOAV	*J2128	13	06A	FO0701	J2124	15	07B	FO0701	J2105	73		FO0701
HAHAOOV	*J2124	10	06B	FO0701	J2123	13		FO0702	J2122	13		FO0701
	J2121	13		FO0701	J2121	37		FO0701	J2122	37		FO0701
	J2123	37		FO0702	J2122	60		FO0702	J2121	60		FO0701
	J2123	60		FO0702								
HAHA1AV	*J2128	08	04A	FO0701	J2124	22	14A	FO0701	J2105	74		FO0701
HAHA10V	*J2124	24	13A	FO0701	*J2124	24	13A	FO2403	J2123	17		FO0702
	J2122	17		FO0702	J2121	17		FO0701	J2121	39		FO0701
	J2122	39		FO0701	J2123	39		FO0701	J2123	59		FO0702
	J2122	59		FO0702	J2121	59		FO0701				
HAHA2AV	*J2128	03	03A	FO0701	J2124	23	12A	FO0701	J2105	75		FO0701
HAHA20V	J2123	61		FO0702	J2122	61		FO0701	J2121	61		FO0701
	J2121	41		FO0701	J2122	41		FO0701	J2123	41		FO0702
	*J2124	25	11A	FO0701	*J2124	25	11A	FO2403	J2123	19		FO0702
	J2122	19		FO0701	J2121	19		FO0701				
HAHA3AV	*J2128	01	02B	FO0701	J2124	20	10A	FO0701	J2105	76		FO0701
HAHA30V	*J2124	18	09A	FO0701	*J2124	18	09A	FO2403	J2123	25		FO0702
	J2122	25		FO0701	J2121	25		FO0701	J2121	49		FO0701
	J2122	49		FO0701	J2123	49		FO0702	J2123	69		FO0702
	J2122	69		FO0702	J2121	69		FO0701				
HAHA4AV	*J2128	07	04B	FO0701	J2124	17	09B	FO0701	J2105	77		FO0701
HAHA40V	J2121	71		FO0701	J2122	71		FO0701	J2123	71		FO0702
	J2123	51		FO0702	J2122	51		FO0701	J2121	51		FO0701
	J2122	27		FO0701	J2122	27		FO0702	J2123	27		FO0702
	*J2124	14	08B	FO0701	*J2124	14	08B	FO2403				
HAHA5AV	*J2128	10	06B	FO0701	J2124	21	11B	FO0701	J2105	78		FO0701
HAHA50V	*J2124	19	10B	FO0701	*J2124	19	10B	FO2403	J2123	31		FO0702
	J2122	31		FO0702	J2121	31		FO0701	J2121	53		FO0701
	J2122	53		FO0702	J2123	53		FO0702	J2123	73		FO0702
	J2122	73		FO0701	J2121	73		FO0701				
HAH011V1	J2125	05		FO0701	*J2121	15	T01	FO0701	J2107	10	07A	FO1501
	J2105	01		FO0701								
HAH012V1	J2125	06		FO0701	*J2121	18	T02	FO0701	J2107	05	03B	FO1501
	J2105	02		FO0701								

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution									
HAH013V1	J2125	07		FO0701	J2121	20	T03	FO0701	J2107	07 03A FO1501
	J2105	03		FO0701						
HAH014V1	J2140	53	28B	FO1507	J2125	08		FO0701	*J2121	22 T04 FO0701
	J2107	13	06B	FO1501	J2105	04		FO0701		
HAH015V1	J2125	09		FO0701	*J2121	24	T05	FO0701	J2107	26 14A FO1501
	J2105	05		FO0701						
HAH016V1	J2125	10		FO0701	*J2121	26	T06	FO0701	J2107	20 11A FO1501
	J2105	06		FO0701						
HAH017V1	J2125	17		FO0701	*J2121	29	T07	FO0701	J2107	19 09B FO1502
	J2105	07		FO0701						
HAH018V1	J2140	06	05A	FO1507	J2125	18		FO0701	*J2121	34 T08 FO0701
	J2107	25	12B	FO1502	J2105	08		FO0701		
HAH021V1	J2125	19		FO0701	*J2121	38	T09	FO0701	J2107	42 20A FO1502
	J2105	09		FO0701						
HAH022V1	J2125	20		FO0701	*J2121	40	T10	FO0701	J2107	36 17A FO1502
	J2105	10		FO0701						
HAH023V1	J2125	24		FO0701	*J2121	42	T11	FO0701	J2107	31 15B FO1502
	J2105	11		FO0701						
HAH024V1	J2125	26		FO0701	*J2121	46	T12	FO0701	J2107	37 18B FO1502
	J2105	12		FO0701						
HAH025V1	J2125	23		FO0701	*J2121	48	T13	FO0701	J2107	56 26A FO1501
	J2105	13		FO0721						
HAH026V1	J2140	03	02A	FO1507	J2125	25		FO0701	*J2121	50 T14 FO0701
	J2107	50	23A	FO1501	J2105	14		FO0701		
HAH027V1	J2140	61	32B	FO1507	J2125	29		FO0701	*J2121	52 T15 FO0701
	J2107	43	23B	FO1501	J2105	15		FO0701		
HAH028V1	J2125	30		FO0701	*J2121	54	T16	FO0701	J2107	49 26B FO1501
	J2105	16		FO0701						
HAH031V1	J2140	13	06B	FO1507	J2125	38		FO0701	*J2121	62 T17 FO0701
	J2107	70	33A	FO1501	J2105	17		FO0701		
MAH032V1	J2125	36		FO0701	*J2121	64	T18	FO0701	J2107	64 30A FO1501
	J2105	18		FO0701						
HAH033V1	J2125	35		FO0701	*J2121	66	T19	FO0701	J2107	55 29B FO1502
	J2105	19		FO0701						
HAH034V1	J2125	37		FO0701	*J2121	68	T21	FO0701	J2107	61 32B FO1502

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution							
	J2105	20		FO0701				
HAH035V1	J2125	39		FO0701	*J2121 70	T20	FO0701	J2107 79 39B FO1502
	J2105	21		FO0701				
HAH036V1	J2125	40		FO0701	*J2121 72	T22	FO0701	J2107 73 36B FO1502
	J2105	22		FO0701				
HAH037V1	J2125	42		FO0701	*J2121 74	T23	FO0701	J2107 74 35B FO1502
	J2105	23		FO0701				
HAH038V1	J2125	46		FO0701	*J2121 76	T24	FO0701	J2107 78 38A FO1502
	J2105	24		FO0701				
HAH041V1	J2125	41		FO0701	*J2122 15	T01	FO0701	J2110 10 07A FO1503
	J2105	25		FO0701				
HAH042V1	J2140	75	37B	FO1507	J2125 45		FO0701	J2122 18 T02 FO0701
	J2110	05	03B	FO1503	J2105 26		FO0701	
HAH043V1	J2125	47		FO0701	*J2122 20	T03	FO0701	J2110 07 03A FO1503
	J2105	27		FO0701				
HAH044V1	J2125	48		FO0701	*J2122 22	T04	FO0701	J2110 13 06B FO1503
	J2105	28		FO0701				
HAH045V1	J2140	22	12A	FO1507	J2125 52		FO0701	*J2122 24 T05 FO0701
	J2110	26	14A	FO1503	J2105 29		FO0701	
HAH046V1	J2125	54		FO0701	*J2122 26	T06	FO0701	J2110 20 11A FO1503
	J2105	30		FO0701				
HAH047V1	J2125	51		FO0701	*J2122 29	T07	FO0701	J2110 19 09B FO0701
	J2105	31		FO1504				
HAH048V1	J2125	53		FO0701	*J2122 34	T08	FO0701	J2110 25 12B FO1504
	J2105	32		FO0701				
HAH051V1	J2125	55		FO0702	*J2122 38	T09	FO0702	J2110 42 20A FO1504
	J2105	33		FO0702				
HAH052V1	J2140	17	08B	FO1507	J2125 56		FO0702	*J2122 40 T10 FO0702
	J2110	36	17A	FO1504	J2105 34		FO0702	
HAH053V1	J2125	62		FO0702	*J2122 42	T11	FO0702	J2110 31 15B FO1504
	J2105	35		FO0702				
HAH054V1	J2125	64		FO0702	*J2122 46	T12	FO0702	J2110 37 18B FO1504
	J2105	36		FO0702				
HAH055V1	J2126	61		FO0702	*J2122 48	T13	FO0702	J2110 56 26A FO1503
	J2105	37		FO0702				
HAH056V1	J2125	63		FO0702	*J2122 50	T14	FO0702	J2110 50 23A FO1503
	J2105	38		FO0702				

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*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution											
HAH057V1	J2125	65		FO0702	*J2122	52	T15	FO0702	J2110	43	23B	FO1503
	J2105	39		FO0702								
HAH058V1	J2125	66		FO0702	*J2122	54	T16	FO0702	J2110	49	26B	FO1503
	J2105	40		FO0702								
HAH061V1	J2140	25	12B	FO1507	J2125	72		FO0702	*J2122	62	T17	FO0702
	J2110	70	33A	FO1503	J2105	41		FO0702				
HAH062V1	J2125	74		FO0702	*J2122	64	T18	FO0702	J2110	64	30A	FO1503
	J2105	42		FO0702								
HAH063V1	J2125	71		FO0702	*J2122	66	T19	FO0702	J2110	55	29B	FO1504
	J2105	43		FO0702								
HAH064V1	J2125	73		FO0702	*J2122	68	T21	FO0702	J2110	61	32B	FO1504
	J2105	44		FO0702								
HAH065V1	J2125	75		FO0702	*J2122	70	T20	FO0702	J2110	79	39B	FO1504
	J2105	45		FO0702								
HAH066V1	J2140	38	18A	FO1507	J2125	76		FO0702	*J2122	72	T22	FO0702
	J2110	73	36B	FO1504	J2105	46		FO0702				
HAH067V1	J2125	77		FO0702	*J2122	74	T23	FO0702	J2110	74	35B	FO1504
	J2105	47		FO0702								
HAH068V1	J2140	65	34B	FO1507	J2125	78		FO0702	*J2122	76	T24	FO0702
	J2110	78	38A	FO1504	J2105	48		FO0702				
HAH071V1	J2127	05		FO0702	*J2123	15	T01	FO0702	J2113	10	07A	FO1505
	J2105	49		FO0702								
HAH072V1	J2140	29	14B	FO1507	J2127	06		FO0702	*J2123	18	T02	FO0702
	J2113	05	03B	FO15OS	J2105	50		FO0702				
HAH073V1	J2127	07		FO0702	*J2123	20	T03	FO0702	J2113	07	03A	FO1505
	J2105	51		FO0702								
HAH074V1	J2127	08		FO0702	*J2123	22	T04	FO0702	J2113	13	06B	FO1505
	J2105	52		FO0702								
HAH075V1	J2140	37	18B	FO1507	J2127	09		FO0702	*J2123	24	T05	FO0702
	J2113	26	14A	FO1505	J2105	53		FO0702				
HAHO76V1	J2127	10		FO0702	*J2123	26	TO6	FO0702	J2113	20	11A	FO1505
	J2105	54		FO0702								
HAH077V1	J2127	17		FO0702	*J2123	29	TO7	FO0702	J2113	19	09B	FO1506
	J2105	55		FO0702								
HAH078V1	J2127	18		FO0702	*J2123	34	TO8	FO0702	J2113	25	12B	FO1506
	J2105	56		FO0702								

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution											
HAH081V1	J2127	19		FO0702	*J2123	38	T09	FO0702	J2113	42	20A	FO1506
	J2105	57		FO0702								
HAH082V1	J2127	20		FO0702	*J2123	40	T10	FO0702	J2113	36	17A	FO1506
	J2105	58		FO0702								
HAH083V1	J2127	24		FO0702	*J2123	42	T11	FO0702	J2113	31	15B	FO1506
	J2105	59		FO0702								
HAH084V1	J2127	26		FO0702	*J2123	46	T12	FO0702	J2113	37	18B	FO1506
	J2105	60		FO0702								
HAH085V1	J2127	23		FO0702	*J2123	48	T13	FO0702	J2113	56	26A	FO1505
	J2105	61		FO0702								
HAH086V1	J2127	25		FO0702	*J2123	50	T14	FO0702	J2113	50	23A	FO1505
	J2105	62		FO0702								
HAH087V1	J2127	29		FO0702	*J2123	52	T15	FO0702	J2113	43	23B	FO1505
	J2105	63		FO0702								
HAH088V1	J2127	30		FO0702	*J2123	54	T16	FO0702	J2113	49	26B	FO1505
	J2105	64		FO0702								
HAH091V1	J2127	38		FO0702	*J2123	62	T17	FO0702	J2113	70	33A	FO1505
	J2105	65		FO0702								
HAH092V1	J2140	76	37A	FO1507	J2127	36		FO0702	*J2123	64	T18	FO0702
	J2113	64	30A	FO1505	J2105	66		FO0702				
HAH093V1	J2127	35		FO0702	*J2123	66	T19	FO0702	J2113	55	29B	FO1506
	J2105	67		FO0702								
HAH094V1	J2127	37		FO0702	*J2123	68	T21	FO0702	J2113	61	32B	FO1506
	J2105	68		FO0702								
HAH095V1	J2140	52	24A	FO1507	J2127	39		FO0702	*J2123	70	T20	FO0702
	J2113	79	39B	FO1506	J2105	69		FO0702				
HAH096V1	J2127	40		FO0702	*J2123	72	T22	FO0702	J2113	73	36B	FO1506
	J2105	70		FO0702								
HAH097V1	J2127	42		FO0702	*J2123	74	T23	FO0702	J2113	74	35B	FO1506
	J2105	71		FO0702								
HAH098V1	J2105	72		FO0702	J2113	78	38A	FO1506	*J2123	76	T24	FO0702
	J2127	46		FO0702								
HAIAAA	*J2109	06	05A	FO1501	J2106	08	06A	FO1501				
HAIABA	J2117	04	04A	FO1501	J2106	03	02A	FO1501				
HAIACA	*J2109	09	04B	FO1501	J2106	11	05B	FO1501				
HAIADA	J2109	11	05B	FO1501	*J2106	38	18A	FO1501				

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAIAEA	J2109	24	13A	FO1502	*J2117	31	15B	FO1502				
HAIAFA	J2109	18	10A	FO1502	*J2117	39	19B	FO1502	J2141	76	37A	FO1507
HAIAFOV	*J2141	78	36A	FO1507	J2140	08	06A	FO1507				
HAIAGA	*J2117	50	23A	FO1502	J2106	48	22A	FO1502				
HAIAHA	*J2109	45	24B	FO1501	J2106	68	32A	FO1501				
HAIAIA	*J2135	47	25B	FO1501	J2109	54	25A	FO1501				
HAIAJA	*J2117	43	23B	FO1501	J2109	62	29A	FO1501				
HAIAKA	J2109	53	28B	FO1502	*J2135	21	10B	FO1502				
HAIALA	J2109	59	31B	FO1502	*J2106	63	33B	FO1502				
HAIBAA	*J2109	72	34A	FO1502	J2106	65	34B	FO1502				
HAIBBA	*J2114	06	05A	FO1503	J2111	08	06A	FO1503				
HAIBCA	*J2117	07	03A	FO1503	J2111	03	02A	FO1503				
HAIBDA	*J2114	01	02B	FO1503	J2111	18	10A	FO1503				
HAIBEA	*J2114	09	04B	FO1504	J2111	17	02B	FO1504				
HAIBFA	*J2114	22	12A	FO1504	J2111	23	11B	FO1504				
HAIBGA	*J2114	14	09A	FO1504	J2111	34	16A	FO1504	J2112	45	25B	FO1507
HAIBGOV	*J2112	43	24B	FO1507	J2140	14	09A	FO1507				
HAIBHA	*J2114	21	10B	FO1504	J2111	29	14B	FO1504				
HAIBIA	*J2114	27	13B	FO1503	J2111	54	25A	FO1503				
HAIBJA	*J2114	51	27B	FO1503	J2111	41	22B	FO1503				
HAIBKA	*J2114	66	31A	FO1503	J2111	62	29A	FO1503				
HAICAA	*J2114	60	28A	FO1504	J2111	53	28B	FO1504				
HAICBA	*J2114	57	30B	FO1504	J2111	59	31B	FO1504				
HAICCA	*J2114	75	37B	FO1505	J2111	71	36A	FO1504	J2112	11	07A	FO1507
HAICCOV	*J2112	13	06A	FO1507	J2140	40	19A	FO1507				
HAICDA	*J2114	72	34A	FO1504	J2111	65	34B	FO1504				
HAICEA	J2115	08	06A	FO1505	*J2114	15	07B	FO1505				
HAICFA	J2116	20	10A	FO1507	J2115	04	04A	FO1505	*J2114	38	18A	FO1505
HAICFOV	*J2116	18	09A	FO1507	J2140	30	15A	FO1507				
HAICGA	*J2117	15	07B	FO1505	J2115	03	02A	FO1505				
HAICHA	J2115	18	10A	FO1505	*J2114	30	15A	FO1505				
HAICIA	J2115	17	08B	FO1506	*J2114	33	16B	FO1506				
HAICJA	J2115	23	11B	FO1506	*J2114	39	19B	FO1506				
HAICKA	J2115	29	14B	FO1506	*J2114	52	24A	FO1506				
HAICLA	J2115	54	25A	FO1505	*J2114	46	21A	FO1505				
HAICMA	J2115	48	22A	FO1505	*J2114	45	24B	FO1505				

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution										
HAICNA	*J2117	36	17A	FO1505	J2115	41	22B	FO1505			
HAICPA	J2115	62	29A	FO1505	*J2114	51	27B	FO1505			
HAICQA	J2115	53	28B	FO1506	*J2114	69	35A	FO1506			
HAICRA	J2115	59	31B	FO1506	*J2114	80	39A	FO1506			
HAIO1AV	*J2108	03	03A	FO1501	J2106	04	04A	FO1501			
HAI02AV	J2109	04	04A	FO1501	*J2108	24	13A	FO1501			
HAI03AV	J2109	17	08B	FO1052	*J2108	40	19A	FO1502			
HAI04AV	*J2108	63	30A	FO1502	J2106	54	25A	FO1502			
HAI05A	*J2109	27	13B	FO1502	J2106	41	22B	FO1502			
HAIO6A	J2141	27	13B	FO1507	*J2109	33	16B	FO1501	J2106	62	29A	FO1501
HA1O60V	*J2141	26	12B	FO1507	J2140	01	02B	FO1507			
HA107AV	J2109	48	22A	FO1507	*J2108	57	30B	FO1501			
HAIO8A	*J2106	14	09A	FO1507	J2109	68	32A	FO1507	J2141	21	11B	FO1507
HAIO8OV	*J2141	19	10B	FO1507	J2140	11	05B	FO1507			
HA109AV	*J2108	78	36A	FO1502	J2106	77	38B	FO1502			
HAI0AV	*J2108	77	38A	FO1502	J2106	71	36A	FO1502			
HAI11A	J2109	77	38B	FO1502	*J2106	80	39A	FO1502			
HA112AV	*J2112	19	10B	FO1503	J2111	04	04A	FO1503			
HAI13AV	*J2112	26	12B	FO1503	J2111	11	05B	FO1503			
HAI14A	*J2106	21	10B	FO1503	J2111	24	13A	FO1503	J2112	61431A		FO1507
HAI14OV	*J2112	63	30A	FO1507	J2140	24	13A	FO1507			
HAI15A	*J2106	57	30B	FO1504	J2111	40	19A	FO1504			
HAI16A	*J2114	63	33B	FO1504	J2111	35	17B	FO1504			
HAI17AV	*J2112	53	26B	FO1503	J2111	48	22A	FO1503			
HAI18AV	*J2112	66	32A	FO1503	J2111	47	25B	FO1503			
HAI19A	*J2106	22	12A	FO1503	J2111	68	32A	FO1503	J2112	38	20A	FO1507
HAI19OV	*J2112	40	19A	FO1507	J2140	23	11B	FO1507			
HAI20AV	*J2112	60	28A	FO1504	J2111	77	38B	FO1504			
HA121A	J2111	76	37A	FO1504	*J2109	69	35A	FO1504			
HAI22AV	*J2116	25	11A	FO1505	J2115	11	05B	FO1505			
HAI23A	*J2106	27	13B	FO1505	J2115	24	13A	FO1505	J2116	51	27B	FO1507
HAI23OV	*J2116	53	26B	FO1507	J2140	35	17B	FO1505			
HAI24AV	*J2116	14	08B	FO1506	J2115	40	19A	FO1505			
HAI25AV	*J2116	19	10B	FO1506	J2115	34	16A	FO1506			
HAI26A	J2115	35	17B	FO1506	*J2109	38	18A	FO1505			
HAI27AV	*J2116	46	22B	FO1505	J2115	47	25B	FO1505			

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Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution										
HAI28AV	*J2116	43	24B	FO1505	J2115	68	32A	FO1505				
HAI29A	J2108	65	33B	FO1507	*J2106	39	19B	FO1506	J2115	77	38B	FO1506
HAI290V	*J2108	68	32B	FO1507	J2140	54	25A	FO1507				
HAI30AV	*J2116	66	32A	FO1506	J2115	71	36A	FO1506				
HAI31A	*J2109	80	39A	FO1506	J2115	65	34B	FO1506				
HAI32AV	J2115	76	37A	FO1506	*J2116	63	30A	FO1506				
HALDCAV	J2114	10	07A	FO1503	J2109	10	07A	FO1501	*J2108	08	04A	FO1300
	J2109	43	23B	FO1501								
HALDDAV	*J2108	60	28A	FO1300	J2114	50	23A	FO1505	J2114	25	12B	FO1505
	J2114	13	06B	FO1503								
HAMGCOT	J2138	59	31B	FO0300	J2136	50	22A	FO0300	*J2139	08	04A	FO0300
HAMGC1T	*J2139	10	05A	FO0300	J2138	61	32B	FO0300				
HAMGC2T	*J2139	14	06A	FO0300	J2136	41	23B	FO0300				
HAMGC3T	J2141	38	20A	FO0300	*J2139	13	07A	FO0300	J2135	34	16A	FO0604
	J2135	40	19A	FO0604	J2134	68	32A	FO0604	J2134	79	39B	FO0604
	J2131	54	25A	FO0601	J2117	26	14A	FO0603	J2117	25	12B	FO0601
HAMXXAV	J2139	05	03B	FO0300	*J2136	49	23A	FO0300				
HAP01D	*J2107	06	05A	FO1501	J2103	01		FO1501				
HAP02D	*J2107	01	02B	FO1501	J2103	03		FO1501				
HAP03D	*J2107	09	048	FO1501	J2103	04		FO1501				
HAP04D	*J2107	15	07B	FO1501	J2103	05		FO1501				
HAP05D	*J2107	22	12A	FO1501	J2103	06		FO1501				
HAP06D	*J2107	14	09A	FO1501	J2103	07						
HAP07D	*J2107	21	10B	FO1502	J2103	08		FO1502				
HAP08D	*J2107	27	13B	FO1502	J2103	09		FO1502				
HAP09D	*J2107	38	18A	FO1502	J2103	10		FO1502				

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution						
HAP10D	*J2107	30	15A	FO1502	J2103	11	FO1502
HAP11D	*J2107	33	16B	FO1502	J2103	13	FO1502
HAP12D	*J2107	39	19B	FO1502	J2103	14	FO1502
HAP13D	*J2107	52	24A	FO1501	J2103	15	FO1501
HAP14D	*J2107	46	21A	FO1501	J2103	17	FO1501
HAP15D	*J2107	45	24B	FO1501	J2103	18	FO1501
HAP16D	*J2107	51	27B	FO1501	J2103	19	FO1501
HAP17D	*J2107	66	31A	FO1501	J2103	20	FO1501
HAP18D	*J2107	60	28A	FO1501	J2103	21	FO1501
HAP19D	*J2107	57	30B	FO1502	J2103	22	FO1502
HAP20D	*J2107	63	33B	FO1502	J2103	23	FO1502
HAP21D	*J2107	75	37B	FO1502	J2103	24	FO1502
HAP22D	*J2107	72	34A	FO1502	J2103	25	FO1502
HAP23D	*J2107	69	35A	FO1502	J2103	26	FO1502
HAP24D	*J2107	80	39A	FO1502	J2103	27	FO1502
HAP25D	*J2110	06	05A	FO1503	J2103	29	FO1503
HAP26D	*J2110	01	02B	FO1503	J2103	30	FO1503
HAP27D	*J2110	09	04B	FO1503	J2103	31	FO1503
HAP28D	*J2110	15	07B	FO1503	J2103	33	FO1503
HAP29D	*J2110	22	12A	FO1503	J2103	34	FO1503
HAP30D	*J2110	14	09A	FO1503	J2103	35	FO1503
HAP31D	*J2110	21	10B	FO1504	J2103	36	FO1504
HAP32D	*J2110	27	13B	FO1504	J2103	37	FO1504
HAP33D	*J2110	38	18A	FO1504	J2103	38	FO1504
HAP34D	*J2110	30	15A	FO1504	J2103	39	FO1504
HAP35D	*J2110	33	16B	FO1504	J2103	40	FO1504
HAP36D	*J2110	39	19B	FO1504	J2103	41	FO1504
HAP37D	*J2110	52	24A	FO1503	J2103	42	FO1503
HAP38D	*J2110	46	21A	FO1503	J2103	43	FO1503
HAP39D	*J2110	45	24B	FO1503	J2103	45	FO1503
HAP40D	*J2110	51	27B	FO1503	J2103	46	FO1503
HAP41D	*J2110	66	31A	FO1503	J2103	47	FO1503
HAP42D	*J2110	60	28A	FO1503	J2103	48	FO1503
HAP43D	*J2110	57	30B	FO1504	J2103	49	FO1504
HAP44D	*J2110	63	33B	FO1504	J2103	50	FO1504
HAP45D	*J2110	75	37B	FO1504	J2103	51	FO1504

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution										
HAP46D	*J2110	72	34A	FO1504	J2103	52		FO1504			
HAP47D	*J2110	69	35A	FO1504	J2103	53		FO1504			
HAP48D	*J2110	80	39A	FO1504	J2103	54		FO1504			
HAP49D	*J2113	06	05A	FO1504	J2103	55		FO1505			
HAP50D	*J2113	01	02B	FO1505	J2103	56		FO1505			
HAP51D	*J2113	09	04B	FO1505	J2103	57		FO1505			
HAP52D	*J2113	15	07B	FO1505	J2103	59		FO1505			
HAP53D	*J2113	22	12A	FO1505	J2103	60		FO1505			
HAP54D	*J2113	21	09A	FO1505	J2103	61		FO1505			
HAP5SD	*J2113	21	10B	FO1506	J2103	62		FO1506			
HAP56D	*J2113	27	13B	FO1506	J2103	63		FO1506			
HAP57D	*J2113	38	18A	FO1506	J2103	64		FO1506			
HAP58D	*J2113	30	15A	FO1506	J2103	65		FO1506			
HAP59D	*J2113	33	16B	FO1506	J2103	66		FO1506			
HAP60D	*J2113	39	19B	FO1506	J2103	68		FO1506			
HAP61D	*J2113	52	24A	FO1505	J2103	69		FO1505			
HAP62D	*J2113	46	21A	FO1505	J2103	70		FO1505			
HAP63D	*J2113	45	24B	FO1505	J2103	71		FO1505			
HAP64D	*J2113	51	27B	FO1505	J2103	72		FO1505			
HAP6SD	*J2113	66	31A	FO1505	J2103	73		FO1505			
HAP66D	*J2113	60	28A	FO1505	J2103	74		FO1505			
HAP67D	*J2113	57	30B	FO1506	J2103	75		FO1506			
HAP68D	*J2113	63	33B	FO1506	J2103	76		FO1506			
HAP69D	*J2113	75	37B	FO1506	J2103	77		FO1506			
HAP70D	*J2113	72	34A	FO1506	J2103	78		FO1506			
HAP71D	*J2113	69	35A	FO1506	J2103	79		FO1506			
HAP72D	*J2113	80	39A	FO1506	J2103	80		FO1506			
HARM2OV	*J2141	70	34B	FO1402	J2136	47	24A	FO0300	J2135	22 12A	FO0500
HARM4OV	J2122	23		FO0701	J2122	21		FO0701	J2121	21	FO0701
	J2121	23		FO0701	J2121	45		FO0701	J2121	47	FO0701
	J2121	63		FO0701	J2121	65		FO0701	*J2136	71 36B	FO1402
HARM5OV	*J2136	70	34B	FO1402	J2123	63		FO0702	J2123	65	FO0702
	J2122	65		FO0702	J2122	63		FO0702	J2122	45	FO0702
	J2122	47		FO0702	J2123	47		FO0702	J2123	45	FO0702
	J2123	23		FO0702	J2123	21		FO0702			
HATAAOV	J2147	78	38A	FO1401	J2146	66	32A	FO1401	J2145	54 25A	FO1401
	J2147	40	19A	FO1401	J2146	26	13A	FO1401	J2147	14 06A	FO1401

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*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution												
	*J2141	13	06A	FO1401									
HATABOV	J2147	74	36A	FO1401	J2146	62	30A	FO1401	J2145	50	23A	FO1401
	J2147	36	17A	FO1401	J2146	22	11A	FO1401	J2147	08	04A	FO1401
	*J2141	08	04A	FO1401									
HATACOV	J2147	62	30A	FO1401	J2145	62	30A	FO1401	J2147	50	23A	FO1401
	J2145	36	17A	FO1401	J2147	22	11A	FO1401	J2145	08	04A	FO1401
	*J2141	03	03A	FO1401									
HATADOV	J2147	66	32A	FO1401	J2145	66	32A	FO1401	J2147	54	25A	FO1401
	J2145	40	19A	FO1401	J2147	26	13A	FO1401	J2145	14	06A	FO1401
	*J2141	01	02B	FO1401									
HATAEOV	J2147	63	32B	FO1401	J2145	63	32B	FO1401	J2147	49	26B	FO1401
	J2145	37	18B	FO1401	J2147	23	12B	FO1401	J2145	09	06B	FO1401
	*J2141	07	04B	FO1401									
HATAFOV	J2147	77	38B	FO1401	J2146	63	32B	FO1401	J2145	49	26B	FO1401
	J2147	37	18B	FO1401	J2146	23	12B	FO1401	J2147	09	06B	FO1401
	*J2141	10	06B	FO1401									
HATAGOV	J2146	78	38A	FO1401	J2145	78	38A	FO1401	J2146	54	25A	FO1401
	J2146	40	19A	FO1401	J2145	26	13A	FO1401	J2146	14	06A	FO1401
	*J2141	24	13A	FO1401									
HATAHOV	J2146	77	38B	FO1401	J2145	77	38B	FO1401	J2146	49	26B	FO1401
	J2146	37	18B	FO1401	J2146	09	06B	FO1401	J2145	23	12B	FO1401
	*J2141	25	11A	FO1401									
HATAJOV	J2146	74	36A	FO1401	J2145	74	36A	FO1401	J2146	50	23A	FO1401
	J2146	36	17A	FO1401	J2145	22	11A	FO1401	J2146	08	04A	FO1401
	*J2141	18	09A	FO1401									
HATO13E	*J2147	10	05A	FO1401	J2146	19	10B	FO1401				
HATO23E	*J2146	24	12A	FO1401	J2147	33	16B	FO1401				
HATO33E	*J2147	38	18A	FO1401	J2145	45	24B	FO1401				
HATO43E	*J2145	52	24A	FO1401	J2146	59	30B	FO1401				
HATO53E	*J2146	64	31A	FO1401	J2147	73	36B	FO1401				
HATO63E	*J2147	76	37A	FO1401	J2146	05	04B	FO1401				
HATO73E	*J2146	10	05A	FO1401	J2145	19	10B	FO1401				
HATO83E	*J2145	24	12A	FO1401	J2146	33	16B	FO1401				
HATO93E	*J2146	38	18A	FO1401	J2145	05	04B	FO1401				
HAT1O3E	J2147	19	10B	FO1401	*J2145	10	05A	FO1401				
HAT113E	J2145	33	16B	FO1401	*J2147	24	12A	FO1401				
HAT123E	J2147	45	24B	FO1401	*J2145	38	18A	FO1401				

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
HAT133E	J2145	59	30B	FO1401	*J2147	52	24A	FO1401				
HAT143E	J2147	59	30B	FO1401	*J2145	64	31A	FO1401				
HAT153E	J2146	45	24B	FO1401	*J2147	64	31A	FO1401				
HAT163E	*J2146	52	24A	FO1401	J2145	73	36B	FO1401				
HAT173E	*J2145	76	37A	FO1401	J2146	73	36B	FO1401				
HAT183E	*J2146	76	37A	FO1401	J2101	22		FO1401				
HA1CCAV	J2135	08	06A	FO0604	J2138	68	32A	FO0605	J2138	55	29B	FO0602
	*J2136	43	24B	FO0300	J2131	49	26B	FO0602	J2117	18	10A	FO0602
HA1CCOV	J2143	53	28B	FO0500	*J2141	40	19A	FO0300	J2136	45	25B	FO0300
HA5CCOV	J2117	65	34B	FO0500	J2134	73	36B	FO0602	J2134	64	30A	FO0603
	J2138	64	30A	FO0604	*J2136	46	22B	FO0300	J2131	50	23A	FO0601
	J2134	05	03B	FO0604								
HA6CCO	J2143	61	32B	FO0604	*J2138	63	33B	FO0300	J2134	74	35B	FO0602
	J2134	55	29B	FO0603	J2131	43	23B	FO0601	J2134	07	03A	FO0604
HBBP1A	J2117	56	26A	FO1502	*J2101	31		FO1507				
HBBP2A	J2135	56	26A	FO1501	*J2101	33		FO1507				
HBBP3A	J2117	48	22A	FO1501	*J2101	34		FO1507				
HBCGDAV	J2141	05	03B	FO1401	J2141	11	07A	FO1401	J2141	22	14A	FO1401
	*J2101	39		FO1402								
HBCGEAV	J2141	04	02A	FO1401	J2141	06	05A	FO1401	J2141	20	10A	FO1401
	*J2101	40		FO1402								
HBCGFAV	J2141	09	05B	FO1401	J2141	15	07B	FO1401	J2141	23	12A	FO1401
	*J2101	41		FO1401								
HBCI0BI	J2142	13		FO0300	J2128	11	07A	FO0701	*J2101	01		FO0200
HBCI1BI	J2142	17		FO0300	J2128	06	05A	FO0701	*J2101	03		FO0200
HBCI2BI	J2142	19		FO0300	J2128	04	02A	FO0701	*J2101	04		FO0200
HBCI3BI	J2142	25		FO0300	J2128	05	03B	FO0701	*J2101	05		FO0200
HBCI4BI	J2142	27		FO0300	J2128	09	05B	FO0701	*J2101	06		FO0200
HBCI5B1	J2142	31		FO0300	J2128	15	07B	FO0701	*J2101	07		FO0200
HBCKBA	*J2101	20		FO1507	J2106	53	28B	FO1504				
HBCPAA	*J2101	50		FO1507	J2117	34	16A	FO1502	J2135	19	09B	FO1502
HBCPOA	*J2101	46		FO1507	J2106	61	32B	FO1502	J2117	33	16B	FO1502
HBCP1A	*J2101	24		FO1300	J2106	42	20A	FO1501	J2117	46	21A	FO1501
	J2114	70	33A	FO1503	J2114	49	26B	FO1503	J2114	36	17A	FO1505
	J2114	05	03B	FO1505								
HBCP2A	J2135	54	25A	FO1501	J2117	47	25B	FO1501	J2117	40	19A	FO1503
	J2117	08	06A	FO1503	J2117	03	02A	FO1505	J2117	11	05B	FO1505

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution											
	*J2101	25		FO1507								
HBCP3A	*J2101	26		FO1507	J2108	15	07B		J2114	07	03A	FO1504
	J2117	05	03B	FO1502	J2117	10	07A	FO1503	J2135	52	24A	FO1502
	J2135	18	10A	FO1501	J2117	30	15A	FO1501				
HBCP4A	*J2101	27		FO1507	J2106	20	11A	FO1501	J2106	19	09B	FO1501
	J2106	26	14A	FO1503	J2106	25	12B	FO1505	J2106	37	18B	FO1506
HBCP5A	*12101	29		FO1507	J2109	76	37A	FO1506	J2114	26	14A	FO1506
	J2114	55	29B	FO1506	J2114	78	38A	FO1504				
HBCP6A	J2117	54	25A	FO1502	J2114	73	36B	FO1504	J2114	19	09B	FO1504
	*J2101	30		FO1507								
HBCP7A	J2114	43	23B	FO1506	J2114	56	26A	FO1505	J2109	73	36B	FO1502
	*J2101	35		FO1507								
HBCP8A	J2117	37	18B	FO1502	*J2101	36		FO1507				
HBCP9A	J2114	79	39B	FO1505	J2114	42	20A	FO1505	J2114	20	11A	FO1505
	*J2101	37		FO1507								
HBFBEO	J2136	79	39B		J2136	65	33B	FO2200	*J201	11		FO2200
HBHAHS	J2117	76	37A	FO0500	J2117	72	34A	FO0500	*J2101	12		FO0800
HBHAI0V	J2143	62	29A	FO0500	J2143	55	29B	FO0500	*J2101	09		FO0800
HBKB15V1	J2117	66	31A	FO0500	*J2101	15		FO0300				
HBKB16V1	J2117	53	28B	FO0500	*J2101	17		FO0300				
HBKB17V1	J2117	57	30B	FO0500	*J2101	18		FO0300				
HBKB18V1	J2117	75	37B	FO0500	*J2101	19		FO0300				
HBLAFO	*J2101	60		FO1300	J2138	71	36A	FO0500				
HBLDCO	J2108	06	05A	FO0130	J2108	62	29A	FO1300	*J2101	42		FO1300
HBNBCA	*J2101	45		FO1507	J2109	29	14B	FO1506				
HBSAKAV	J2141	69	35B	FO1402	J2136	73	37B	FO1402	J2136	69	35B	FO1402
	*J2101	23		FO1402								
HBTE3A	J2134	59	31B	FO0500	J2124	04	02A	FO1000	J2124	06	05A	FO1000
	J2124	11	07A	FO1000	*J2101	10		FO0902				
HBT4COV	J2144	46	21A	FO0500	J2144	30	15A	FO0500	*J2101	14		FO0901
HBWAKA	*J2101	47		FO1600	J2106	47	25B	FO0605	J2109	34	16A	FO0605
	J2109	35	17B	FO0605	J2109	47	25B	FO0605				
HBYBPOV	J2138	65	34B	FO0300	*J2101	43		FO0400				
HCDO00	J2120	03	03B	FO1000	*J2102	01		FO1101				
HCDO10	J2120	01	02B	FO1000	*J2102	03		FO1101				
HCDO20	J2120	04	02A	FO1000	*J2102	04		FO1101				
HCDO30	J2120	06	03A	FO1000	*J2102	05		FO1101				

*Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued*

Signal	Distribution						
HCDO40	J2120	17	09B	FO1000	*J2102	06	FO1101
HCDO50	J2120	15	08B	FO1000	*J2102	07	FO1101
HCDO60	J2120	18	09A	FO1000	*J2102	08	FO1101
HCDO70	J2120	20	10A	FO1000	*J2102	09	FO1101
HCDO80	J2120	31	15B	FO1000	*J2102	10	FO1102
HCDO90	J2120	29	14B	FO1000	*J2102	11	FO1102
HCD1O0	J2120	30	15A	FO1000	*J2102	13	FO1102
HCD110	J2120	34	16A	FO1000	*J2102	14	FO1102
HCD120	J2120	43	23B	FO1000	*J2102	15	FO1102
HCD130	J2120	41	22B	FO1000	*J2102	17	FO1102
HCD140	J2120	46	21A	FO1000	*J2102	18	FO1102
HCD150	J2120	48	22A	FO1000	*J2102	19	FO1102
HCD160	J2120	55	29B	FO1000	*J2102	20	FO1103
HCD170	J2120	53	28B	FO1000	*J2102	21	FO1103
HCD180	J2120	57	28A	FO1000	*J2102	22	FO1103
HCD190	J2120	60	29A	FO1000	*J2102	23	FO1103
HCD2O0	J2120	71	35B	FO1000	*J2102	24	FO1103
HCD210	J2120	69	34B	FO1000	*J2102	25	FO1103
HCD220	J2120	70	34B	FO1000	*J2102	26	FO1103
HCD230	J2120	72	35A	FO1000	*J2102	27	FO1103
HCD240	J2119	03	03B	FO1000	*J2102	29	FO1104
HCD250	J2119	01	02B	FO1000	*J2102	30	FO1104
HCD260	J2119	04	02A	FO1000	*J2102	31	FO1104
HCD270	J2119	06	03A	FO1000	*J2102	33	FO1104
HCD280	J2119	11	09B	FO1000	*J2102	34	FO1104
HCD290	J2119	15	08B	FO1000	*J2102	35	FO1104
HCD3O0	J2119	18	09A	FO1000	*J2102	36	FO1104
HCD310	J2119	20	10A	FO1000	*J2102	37	FO1104
HCD320	J2119	31	15B	FO1000	*J2102	38	FO1104
HCD330	J2119	29	14B	FO1000	*J2102	39	FO1105
HCD340	J2119	30	15A	FO1000	*J2102	40	FO1105
HCD350	J2119	34	16A	FO1000	*J2102	41	FO1105
HCD360	J2118	03	03B	FO1000	*J2102	42	FO1105
HCD370	J2118	01	02B	FO1000	*J2102	43	FO1105
HCD380	J2118	04	02A	FO1000	*J2102	45	FO1105
HCD390	J2118	06	03A	FO1000	*J2102	46	FO1105
HCD4O0	J2118	17	09B	FO1000	*J2102	47	FO1106

Table 7-8. Right Hand Digital Card Cage Key Signal Lookup
-Continued

Signal	Distribution					
HCD410	J2118	15	08B	FO1000	*J2102 48	FO1106
HCD420	J2118	18	09A	FO1000	*J2102 49	FO1106
HCD430	J2118	20	10A	FO1000	*J2102 50	FO1106
HCD440	J2118	31	15B	FO1000	*J2102 51	FO1106
HCD450	J2118	29	14B	FO1000	*J2102 52	FO1106
HCD460	J2118	30	15A	FO1000	*J2102 53	FO1106
HCD470	J2118	34	16A	FO1000	*J2102 54	FO1106
HCD480	J2118	43	23B	FO1000	*J2102 55	FO1107
HCD490	J2118	41	22B	FO1000	*J2102 56	FO1107
HCD5O0	J2118	46	21A	FO1000	*J2102 57	FO1107
HCD510	J2118	48	22A	FO1000	*J2102 59	FO1107
HCD520	J2118	55	29B	FO1000	*J2102 60	FO1107
HCD530	J2118	53	28B	FO1000	*J2102 61	FO1107
HCD540	J2118	57	28A	FO1000	*J2102 62	FO1107
HCD550	J2118	60	29A	FO1000	*J2102 63	FO1107
HCD560	J2118	71	35B	FO1000	*J2102 64	FO1108
HCD570	J2118	69	34B	FO1000	*J2102 65	FO1108
HCD580	J2118	70	34A	FO1000	*J2102 66	FO1108
HCD590	J2118	72	35A	FO1000	*J2102 68	FO1108
HCD6O0	J2119	43	23B	FO1000	*J2102 69	FO1108
HCD610	J2119	41	22B	FO1000	*J2102 70	FO1108
HCD620	J2119	46	21A	FO1000	*J2102 71	FO1108
HCD630	J2119	48	22A	FO1000	*J2102 72	FO1108
HCD640	J2119	55	29B	FO1000	*J2102 73	FO1108
HCD650	J2119	53	28B	FO1000	*J2102 74	FO1108
HCD660	J2119	57	28A	FO1000	*J2102 75	FO1108
HCD670	J2119	60	29A	FO1000	*J2102 76	FO1108
HCD680	J2119	71	35B	FO1000	*J2102 77	FO1108
HCD690	J2119	69	34B	FO1000	*J2102 78	FO1108
HCD7O0	J2119	70	34A	FO1000	*J2102 79	FO1108
HCD710	J2119	72	35A	FO1000	*J2102 80	FO1108

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Table 7-9. Analog Assembly Key Signal Lookup

Signal			Distribution					
HACWAOV	J3106	06	FO1900					
HADAAO	J3107	21	FO2101	J3107	21	FO1501		
HADABO	J3107	22	FO2101	J3107	22	FO1501		
HADACO	J3107	19	FO2101	J3107	19	FO1501		
HADADO	J3107	20	FO2101	J3107	20	FO1501		
HADAEO	J3107	24	FO2101	J3107	24	FO1501		
HADAFO	J3107	17	FO2101	J3107	17	FO1501		
HADAGO	J3108	21	FO2102	J3108	21	FO1502		
HADAHO	J3108	22	FO2102	J3108	22	FO1502		
HADAIO	J3108	19	FO2102	J3108	19	FO1502		
HADAJO	J3108	20	FO2102	J3108	20	FO1502		
HADAKO	J3108	24	FO2102	J3108	24	FO1502		
HADALO	J3108	17	FO2102	J3108	17	FO1502		
HADAMO	J3109	21	FO2102	J3109	21	FO1501		
HADANO	J3109	22	FO2102	J3109	22	FO1501		
HADAPO	J3109	19	FO2102	J3109	19	FO1501		
HADAQO	J3109	20	FO2102	J3109	20	FO1501		
HADARO	J3110	21	FO2102	J3110	21	FO1501		
HADASO	J3109	17	FO2102	J3109	17	FO1501		
HADATO	J3109	24	FO2102	J3109	24	FO1502		
HADAUO	J3110	22	FO2102	J3110	22	FO1502		
HADBAO	J3110	17	FO2102	J3110	17	FO1502		
HADBBO	J3110	20	FO2102	J3110	20	FO1502		
HADBCO	J3110	24	FO2102	J3110	24	FO1502	J3114	22	FO2103
	J3114	22	FO1502					
HADBDO	J3110	19	FO2102	J3110	19	FO1502		
HADBEO	J3111	19	FO2102	J3111	19	FO1503		
HADBFO	J3111	22	FO2102	J3111	22	FO1503		
HADBGO	J3111	21	FO2102	J3111	21	FO1503		
HADBHO	J3111	20	FO2102	J3111	20	FO1503		
HADBIO	J3111	24	FO2102	J3111	24	FO1503		
HADBJO	J3111	17	FO2102	J3111	17	FO1503		
HADBKO	J3112	21	FO2103	J3112	21	FO1504		
HADBLO	J3112	22	FO2103	J3112	22	FO1504		
HADBMO	J3112	19	FO2103	J3112	19	FO1504		
HADBNO	J3112	20	FO2103	J3112	20	FO1504		
HADBPO	J3112	24	FO2103	J3112	24	FO1504		

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution					
HADBQO	J3112	17	FO2103	J3112	17	FO1504
HADBRO	J3113	21	FO2103	J3113	21	FO1503
HADBSO	J3113	22	FO2103	J3113	22	FO1503
HADBTO	J3113	19	FO2103	J3113	19	FO1503
HADBUO	J3113	20	FO2103	J3113	20	FO1503
HADBVO	J3113	24	FO2103	J3113	24	FO1503
HADBWO	J3113	17	FO2103	J3113	17	FO1503
HADCAO	J3114	21	FO2103	J3114	21	FO1504
HADCBO	J3114		FO2103	J3114		FO1504
HADCCO	J3114	19	FO2103	J3114	19	FO1504
HADCDO	J3114	20	FO2103	J3114	20	FO1504
HADCEO	J3114	24	FO2103	J3114	24	FO1504
HADCFO	J3114	17	FO2103	J3114	17	FO1504
HADCGO	J3115	21	FO2103	J3115	21	FO1505
HADCHO	J3115	22	FO2103	J3115	22	FO1505
HADCIO	J3115	19	FO2103	J3115	19	FO1505
HADCJO	J3115	20	FO2103	J3115	20	FO1505
HADCKO	J3115	24	FO2103	J3115	24	FO1505
HADCLO	J3115	17	FO2103	J3115	17	FO1505
HADCMO	J3116	21	FO2104	J3116	21	FO1506
HADCNO	J3116	22	FO2104	J3116	22	FO1506
HADCPO	J3116	19	FO2104	J3116	19	FO1506
HADCQO	J3116	20	FO2104	J3116	20	FO1506
HADCRO	J3116	24	FO2104	J3116	24	FO1506
HADCSO	J3116	17	FO2104	J3116	17	FO1506
HADCTO	J3117	21	FO2104	J3117	21	FO1505
HADCUO	J3117	22	FO2104	J3117	22	FO1505
HADCVO	J3117	19	FO2104	J3117	19	FO1505
HADCWO	J3117	20	FO2104	J3117	20	FO1505
HADCXO	J3117	24	FO2104	J3117	24	FO1505
HADCYO	J3117	17	FO2104	J3117	17	FO1505
HADCZO	J3118	21	FO2104	J3118	21	FO1506
HADDAO	J3118	22	FO2104	J3118	22	FO1506
HADDBO	J3118	19	FO2104	J3118	19	FO1506
HADDCO	J3118	20	FO2104	J3118	20	FO1506
HADDDO	J3118	24	FO2104	J3118	24	FO1506

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution			
HADDEO	J3118 17	FO2104	J3118 17	FO1506
HAGM1A	J3105 41	FO2104	J3105 41	FO0601
HAGM2A	J3105 59	FO2104	J3105 59	FO0601
HAGM4A	J3105 69	FO2104	J3105 69	FO0601
HAG01A	J3104 22	FO0601	J3104 22	FO2101
HAG01OV	J3103 01	FO0601	J3107 25	FO2101
HAG02A	J3104 30	FO0601		
HAG02OV	J3103 03	FO0601	J3107 42	FO2101
HAG03A	J3104 23	FO0601		
HAG03OV	J3103 04	FO0601	J3107 33	FO2101
HAG04OV	J3103 05	FO0601		
HAG05OV	J3103 06	FO0601	J3107 30	FO2101
HAG06A	J3104 40	FO0601		
HAG06OV	J3103 07	FO0601	J3107 37	FO2101
HAG07A	J3104 32	FO0601	J3104 32	FO2102
HAG07OV	J3103 08	FO0601	J3108 25	FO2102
HAG08OV	J3103 09	FO0601	J3108 42	FO2102
HAG09A	J3104 43	FO0601	J3104 43	FO2102
HAG09OV	J3103 10	FO0601	J3108 33	FO2102
HAG10A	J3104 59	FO0601	J3104 59	FO2102
HAG10OV	J3103 11	FO0601	J3108 35	FO2102
HAG11A	J3104 49	FO0601	J3104 49	FO2102
HAG11OV	J3103 13	FO6601	J3108 30	FO2102
HAG12A	J3104 48	FO0601	J3104 48	FO2102
HAG12OV	J3103 14	FO0601	J3108 37	FO2102
HAG13A	J3104 53	FO0601	J3014 53	FO2102
HAG13OV	J3103 15	FO0601	J3109 25	FO2102
HAG14OV	J3103 17	FO0601	J3109 42	FO2102
HAG15OV	J3103 18	FO0601	J3109 33	FO2102
HAG16A	J3104 63	FO0601	J3104 63	FO2102
HAG16OV	J3103 19	FO0601	J3109 35	FO2102
HAG170V	J3103 20	FO0602	J3110 25	FO2102
HAG18A	J3104 19	FO0602	J3104 19	FO2102
HAG18OV	J3103 21	FO0602	J3109 37	FO2102
HAG19A	J3104 20	FO0602	J3104 20	FO2102

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution					
HAG19OV	J3103	22	FO0602	J3109	30	FO2102
HAG20A	J3104	18	FO0602	J3104	18	FO2102
HAG20OV	J3103	23	FO0602	J3110	42	FO2102
HAG21A	J3104	21	FO0602	J3104	21	FO2102
HAG21OV	J3103	24	FO0602	J3110	37	FO2102
HAG22A	J3104	28	FO0602	J3104	28	FO2102
HAG22OV	J3103	25	FO0602	J3110	35	FO2102
HAG23A	J3104	31	FO0602			
HAG23OV	J3103	26	FO0602	J3110	30	
HAG24A	J3104	38	FO0602	J3104	38	FO2102
HAG24OV	J3103	27	FO0602	J3110	33	FO2102
HAG25A	J3104	41	FO0602	J3104	41	FO2102
HAG25OV	J3103	29	FO0602	J3111	33	FO2102
HAG26OV	J3103	30	FO0602	J3111	42	FO2102
HAG27A	J3104	51	FO0602	J3104	51	FO2102
HAG27OV	J3103	31	FO0602	J3111	25	FO2102
HAG28A	J3104	52	FO0602	J3104	52	FO2102
HAG28OV	J3103	33	FO0602	J3111	35	
HAG29OV	J3103	34	FO0602	J3111	30	FO2102
HAG30A	J3104	60	FO0602	J3104	60	FO2102
HAG30OV	J3103	35	FO0602	J3111	37	FO2102
HAG31A	J3104	67	FO0602	J3104	67	FO2103
HAG31OV	J3103	36	FO0602	J3112	25	FO2103
HAG32A	J3104	62	FO0602	J3104	62	FO2103
HAG32OV	J3103	37	FO0602	J3112	42	FO2103
HAG33A	J3104	13	FO0603	J3104	13	FO2103
HAG33OV	J3103	38	FO0603	J3112	33	FO2103
HAG34OV	J3103	39	FO0603	J3112	35	FO2103
HAG35A	J3104	68	FO0603	J3104	68	FO2103
HAG35OV	J3103	40	FO0603	J3112	30	FO2103
HAG36A	J3104	69	FO0603	J3104	69	FO2103
HAG36OV	J3103	41	FO0603	J3112	37	FO2103
HAG37A	J3105	22	FO0603	J3105	22	FO2103
HAG37OV	J3103	42	FO0603	J3113	25	FO2103
HAG38A	J3105	30	FO0603	J3105	30	FO2103
HAG38OV	J3103	43	FO0603	J3113	42	FO2103

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution					
HAG39A	J3105	23	FO0603	J3105	23	FO2103
HAG39OV	J3103	45	FO0603	J3113	33	FO2103
HAG40A	J3105	33	FO2103	J3105	33	FO0603
HAG40OV	J3103	46	FO0603	J3113	35	FO2103
HAG41OV	J3103	47	FO0603	J3113	30	FO2103
HAG42A	J3105	40	FO0603	J3105	40	FO2103
HAG42OV	J3103	48	FO0603	J3113	37	FO2103
HAG43A	J3105	32	FO0603	J3105	32	FO2103
HAG43OV	J3103	49	FO0603	J3114	25	FO2103
HAG44A	J3105	39	FO0603	J3105	39	FO2103
HAG44OV	J3103	50	FO0603	J3114	42	FO2103
HAG45A	J3105	43	FO0603	J3105	43	FO2103
HAG45OV	J3103	51	FO0603	J3114	33	FO2103
HAG46OV	J3103	52	FO0603	J3114	35	FO2103
HAG47A	J3105	49	FO0603	J3105	49	FO2103
HAG47OV	J3103	53	FO0603	J3114	30	FO2103
HAG48OV	J3103	54	FO0603	J3114	37	FO2103
HAG49A	J3105	53	FO0604	J3105	53	FO2103
HAG49OV	J3103	55	FO0604	J3115	25	FO2103
HAG50OV	J3103	56	FO0604	J3115	42	FO2103
HAG51A	J3105	64	FO0604	J3105	64	FO2103
HAG51OV	J3103	57	FO0604	J3115	33	FO2103
HAG52A	J3105	63	FO0604	J3105	63	FO2103
HAG52OV	J3103	59	FO0604	J3115	35	
HAG53OV	J3103	60	FO0604	J3115	30	FO2103
HAG54A	J3105	19	FO0604	J3105	19	FO2103
HAG54OV	J3103	61	FO0604	J3115	37	FO2103
HAG55A	J3105	20	FO0604	J3105	20	FO2104
HAG55OV	J3103	62	FO0604	J3116	25	FO2104
HAG56A	J3105	18	FO2104	J3105	18	FO0604
HAG56OV	J3103	63	FO0604	J3116	42	FO2104
HAG57A	J3105	21	FO0604	J3105	21	FO2104
HAG57OV	J3103	64	FO0604	J3116	33	FO2104
HAG58A	J3105	28	FO0604	J3105	28	FO2104
HAG58OV	J3103	65	FO0604	J3116	35	FO2104
HAG59A	J3105	31	FO0604	J3105	31	FO2104

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal				Distribution		
HAG59OV	J3103	66	FO0604	J3116	30	FO2104
HAG60A	J3105	38	FO2104	J3105	38	FO0604
HAG60OV	J3103	68	FO0604	J3116	37	FO2104
HAG61OV	J3103	69	FO0604	J3117	25	
HAG62A	J3105	50	FO0604	J3105	50	FO2104
HAG62OV	J3103	70	FO0604	J3117	42	FO2104
HAG63A	J3105	51	FO0604	J3105	51	FO2104
HAG63OV	J3103	71	FO0604	J3117	33	FO2104
HAG64A	J3105	52	FO0604	J3105	52	FO2104
HAG64OV	J3103	72	FO0604	J3117	35	FO2104
HAG65OV	J3103	73	FO0605	J3117	30	FO2104
HAG66OV	J3103	74	FO0605	J3117	37	FO2104
HAG67A	J3105	67	FO0605	J3105	67	FO2104
HAG67OV	J3103	75	FO0605	J3118	25	FO2104
HAG68A	J3105	62	FO0605	J3105	62	FO2104
HAG68OV	J3103	76	FO0605	J3118	42	FO2104
HAG69A	J3105		FO2104			
HAG69OV	J3103	77	FO0605	J3118	33	FO2104
HAG70A	J3105	13	FO0605	J3105	13	FO2104
HAG70OV	J3103	78	FO0605	J3118	35	FO2104
HAG71A	J3105	68	FO0605	J3105	68	FO2104
HAG71OV	J3103	79	FO0605	J3118	30	FO2104
HAG72OV	J3103	80	FO0605	J3118	37	FO2104
HAHA0AV	J3101	73	FO0701	J3113	76	FO2101
HAHA1AV	J3101	74	FO0701	J3114	76	FO2101
HAHA2AV	J3101	75	FO0701	J3115	76	FO2101
HAHA3AV	J3101	76	FO0701	J3116	76	FO2101
HAHA4AV	J3101	77	FO0701	J3117	76	FO2101
HAHA5AV	J3101	78	FO0701	J3118	76	FO2101
HAH011V1	J3101	01	FO0701	J3107	47	FO2101
HAH012V1	J3101	02	FO0701	J3107	57	FO2101
HAH013V1	J3101	03	FO0701	J3107	55	FO2101
HAH014V1	J3101	04	FO0701	J3107	50	FO2101
HAH015V1	J3101	05	FO0701	J3107	41	FO2101
HAH016V1	J3101	06	FO0701	J3107	45	FO2101
HAH017V1	J3101	07	FO0701	J3108	47	FO2102

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal						Distribution	
HAH018V1	J3101	08	FO0701	J3108	57	FO2102	
HAH021V1	J3101	09	FO0701	J3108	55	FO2102	
HAH022V1	J3101	10	FO0701	J3108	50	FO2102	
HAH023V1	J3101	11	FO0701	J3108	41	FO2102	
HAH024V1	J3101	12	FO0701	J3108	45	FO2102	
HAH025V1	J3101	13	FO0701	J3109	47	FO2102	
HAH026V1	J3101	14	FO0701	J3109	57	FO2102	
HAH027V1	J3101	15	FO0701	J3109	55	FO2102	
HAH028V1	J3101	16	FO0701	J3109	50	FO2102	
HAH031V1	J3101	17	FO0701	J3110	47	FO2102	
HAH032V1	J3101	18	FO0701	J3109	45	FO2102	
HAH033V1	J3101	19	FO0701	J3109	41	FO2102	
HAH034V1	J3101	20	FO0701	J3110	57	FO2102	
HAH035V1	J3101	21	FO0701	J3110	45	FO2102	
HAH036V1	J3101	22	FO0701	J3110	50	FO2102	
HAH037V1	J3101	23	FO0701	J3110	41	FO2102	
HAH038V1	J3101	24	FO0701	J3110	55	FO2102	
HAH041V1	J3101	25	FO0701	J3111	55	FO2102	
HAH042V1	J3101	26	FO0701	J3111	57	FO2012	
HAH043V1	J3101	27	FO0701	J3111	47	FO2102	
HAH044V1	J3101	28	FO0701	J3111	50	FO2102	
HAH045V1	J3101	29	FO0701	J3111	41	FO2102	
HAH046V1	J3101	30	FO0701	J3111	45	FO2102	
HAH047V1	J3101	31	FO0701	J3112	47	FO2103	
HAH048V1	J3101	32	FO0701	J3112	57	FO2103	
HAH051V1	J3101	33	FO0702	J3112	55	FO2103	
HAH052V1	J3101	34	FO0702	J3112	50	FO2103	
HAH053V1	J3101	35	FO0702	J3112	41	FO2103	
HAH054V1	J3101	36	FO0702	J3112	45	FO2103	
HAH055V1	J3101	37	FO0702	J3113	47	FO2103	
HAH056V1	J3101	38	FO0702	J3113	57	FO2103	
HAH057V1	J3101	39	FO0702	J3113	55	FO2103	
HAH058V1	J3101	40	FO0702	J3113	50	FO2103	
HAH061V1	J3101	41	FO0702	J3113	41	FO2103	
HAH062V1	J3101	42	FO0702	J3113	45	FO2103	
HAH063V1	J3101	43	FO0702	J3114	47	FO2103	

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal				Distribution			
HAH064V1	J3101	44	FO0702	J3114	57	FO2103
HAH065V1	J3101	45	FO0702	J3114	55	FO2103
HAH066V1	J3101	46	FO0702	J3114	50	FO2103
HAH067V1	J3101	47	FO0702	J3114	41	FO2103
HAH068V1	J3101	48	FO0702	J3114	45	FO2103
HAH071V1	J3101	49	FO0702	J3115	47	FO2103
HAH072V1	J3101	50	FO0702	J3115	57	FO2103
HAH073V1	J3101	51	FO0702	J3115	55	FO2103
HAH074V1	J3101	52	FO0702	J3115	50	FO2103
HAH075V1	J3101	53	FO0702	J3115	41	FO2103
HAH076V1	J3101	54	FO0702	J3115	45	FO2103
HAH077V1	J3101	55	FO0702	J3116	47	FO2104
HAH078V1	J3101	56	FO0702	J3116	57	FO2104
HAH081V1	J3101	57	FO0702	J3116	55	FO2104
HAH082V1	J3101	58	FO0702	J3116	50	FO2104
HAH083V1	J3101	59	FO0702	J3116	41	FO2104
HAH084V1	J3101	60	FO0702	J3116	45	FO2104
HAH085V1	J3101	61	FO0702	J3117	47	FO2104
HAH086V1	J3101	62	FO0702	J3117	57	FO2104
HAH087V1	J3101	63	FO0702	J3117	55	FO2104
HAH088V1	J3101	64	FO0702	J3117	50	FO2104
HAH091V1	J3101	65	FO0702	J3117	41	FO2104
HAH092V1	J3101	66	FO0702	J3117	45	FO2104
HAH093V1	J3101	67	FO0702	J3118	47	FO2104
HAH094V1	J3101	68	FO0702	J3118	57	FO2104
HAH095V1	J3101	69	FO0702	J3118	55	FO2104
HAH096V1	J3101	70	FO0702	J3118	50	FO2104
HAH097V1	J3101	71	FO0702	J3118	41	FO2104
HAH098V1	J3101	72	FO0702	J3118	45	FO2104
HAL04A	J3104	33	FO1507	J3104	33	FO2101
HAL08A	J3104	29	FO1507	J3104	29	FO2102
HAL14A	J3104	61	FO1507	J3104	61	FO2102
HAL15A	J3104	64	FO1507	J3104	64	FO2102
HAL17A	J3104	12	FO1507	J3104	12	FO2102
HAL26A	J3104	50	FO1507	J3104	50	FO2102
HAL29A	J3104	42	FO1507	J3104	42	FO2102

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal			Distribution					
HAL34A	J3104	14	FO1507	J3104	14	FO2103		
HAL41A	J3105	29	FO1507	J3105	29	FO2103		
HAL46A	J3105	42	FO1507	J3105	42	FO2103		
HAL48A	J3105	48	FO1507	J3105	48	FO2103		
HAL50A	J3105	61	FO1507	J3105	61	FO2103		
HAL53A	J3105	12	FO1507	J3105	12	FO2103		
HAL66A	J3105	60	FO1507	J3105	60	FO2104		
HAL69A	J3105	14	FO1507	J3105	14	FO2104		
HAP01D	J3102	01	FO1501	J3104	07	FO2101	J3107	14	FO2101
HAP02D	J3102	03	FO1501	J3014	04	FO2101	J3107	26	FO2101
HAP03D	J3102	04	FO1501	J3104	16	FO2101	J3107	11	FO2101
HAP04D	J3102	05	FO1501	J3104	15	FO2101	J3107	18	FO2101
HAP05D	J3102	06	FO1501	J3104	35	FO2101	J3107	23	FO2101
HAP06D	J3102	07	FO1501	J3104	25	FO2102	J3107	04	FO2102
HAP07D	J3102	08	FO1502	J3104	36	FO2102	J3108	14	FO2102
HAP08D	J3102	09	FO1502	J3104	26	FO2102	J3108	26	FO2102
HAP09D	J3102	10	FO1502	J3104	46	FO2102	J3108	11	FO2102
HAP10D	J3102	11	FO1502	J3104	71	FO2102	J3108	18	FO2102
HAP11D	J3102	13	FO1502	J3104	56	FO2102	J3108	23	FO2102
HAP12D	J3102	14	FO1502	J3104	55	FO2102	J3108	04	FO2102
HAP13D	J3102	15	FO1501	J3104	70	FO2102	J3109	14	FO2102
HAP14D	J3102	17	FO1501	J3104	66	FO2102	J3109	26	FO2102
HAP15D	J3102	18	FO1501	J3104	78	FO2102	J3109	11	FO2102
HAP16D	J3102	19	FO1501	J3104	77	FO2102	J3109	18	FO2102
HAP17D	J3102	20	FO1501	J3104	08	FO2102	J3110	14	FO2102
HAP18D	J3102	21	FO1501	J3104	03	FO2102	J3109	04	FO2102
HAP19D	J3102	22	FO1502	J3104	17	FO2102	J3109	23	FO2102
HAP20D	J3102	23	FO1502	J3104	10	FO2102	J3110	26	FO2102
HAP21D	J3102	24	FO1502	J3104	27	FO2102	J3110	04	FO2102
HAP22D	J3102	25	FO1502	J3104	24	FO2102	J3110	18	FO2102
HAP23D	J3102	26	FO1502	J3104	37	FO2102	J3110	23	FO2102
HAP24D	J3102	27	FO1502	J3104	34	FO2102	J3110	11	FO2102
HAP25D	J3102	29	FO1503	J3104	47	FO2102	J3111	11	FO2102
HAP26D	J3102	30	FO1503	J3104	44	FO2102	J3111	26	FO2102
HAP27D	J3102	31	FO1503	J3104	57	FO2102	J3111	14	FO2102
HAP28D	J3102	33	FO1503	J3104	54	FO2102	J3111	18	FO2102

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution						
HAP29D	J3102	34	FO1503	J3104	45	FO2102	J3111	23	FO2102
HAP30D	J3102	35	FO1503	J3104	65	FO2102	J3111	04	FO2102
HAP31D	J3102	36	FO1504	J3104	79	FO2103	J3112	14	FO2103
HAP32D	J3102	37	FO1504	J3104	76	FO2103	J3112	26	FO2103
HAP33D	J3102	38	FO1504	J3104	01	FO2103	J3112	11	FO2103
HAP34D	J3102	39	FO1504	J3104	09	FO2103	J3112	18	FO2103
HAP35D	J3102	40	FO1504	J3104	80	FO2103	J3112	23	FO2103
HAP36D	J3102	41	FO1504	J3104	72	FO2103	J3112	04	FO2103
HAP37D	J3102	42	FO1503	J3105	07	FO2103	J3113	14	FO2103
HAP38D	J3102	43	FO1503	J3105	04	FO2103	J3113	26	FO2103
HAP39D	J3102	45	FO1503	J3105	16	FO2103	J3113	11	FO2103
HAP40D	J3102	46	FO1503	J3105	15	FP2103	J3113	18	FO2103
HAP41D	J3102	47	FO1503	J3105	26	FO2103	J3113	23	FO2103
HAP42D	J3102	48	FO1503	J3105	25	FO2103	J3113	04	FO2103
HAP43D	J3102	49	FO1504	J3105	36	FO2103	J3114	14	FO2103
HAP44D	J3102	50	FO1504	J3105	35	FO2103	J3114	26	FO2103
HAP45D	J3102	5	FO1504	J3105	46	FO2103	J3114	11	FO2103
HAP46D	J3102	52	FO1504	J3105	45	FO2103	J3114	18	FO2103
HAP47D	J3102	53	FO1504	J3105	56	FO2103	J3114	23	FO2103
HAP48D	J3102	54	FO1504	J3105	55	FO2103	J3114	04	FO2103
HAP49D	J3102	55	FO1505	J3105	70	FO2103	J3115	14	FO2103
HAP50D	J3102	56	FO1505	J3105	66	FO2103	J3115	26	FO2103
HAP51D	J3102	57	FO1505	J3105	78	FO2103	J3115	11	FO2103
HAP52D	J3102	59	FO1505	J3105	77	FO2103	J3115	18	FO2103
HAP53D	J3102	60	FO1505	J3105	08	FO2103	J3115	23	FO2103
HAP54D	J3102	61	FO1505	J3105	03	FO2103	J3115	04	FO2103
HAP55D	J3102	62	FO1506	J3105	17	FO2104	J3116	14	FO2104
HAP56D	J3102	63	FO1506	J3105	10	FO2104	J3116	26	FO2104
HAP57D	J3102	64	FO1506	J3105	27	FO2104	J3116	11	FO2104
HAP58D	J3102	65	FO1506	J3105	24	FO2104	J3116	18	FO2104
HAP59D	J3102	66	FO1506	J3105	37	FO2104	J3116	23	FO2104
HAP60D	J3102	68	FO1506	J3105	34	FO2104	J3116	04	FO2104
HAP61D	J3102	69	FO1505	J3105	47	FO2104	J3117	14	FO2104
HAP62D	J3102	70	FO1505	J3105	44	FO2104	J3117	26	FO2104
HAP63D	J3102	71	FO1505	J3105	57	FO2104	J3117	11	FO2104
HAP64D	J3102	72	FO1505	J3105	54	FO2104	J3117	18	FO2104

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution						
HAP65D	J3102	73	FO1505	J3105	71	FO2104	J3117	23	FO2104
HAP66D	J3102	74	FO1505	J3105	65	FO2104	J3117	04	FO2104
HAP67D	J3102	75	FO1506	J3105	79	FO2104	J3118	14	FO2104
HAP68D	J3102	76	FO1506	J3105	76	FO2104	J3118	26	FO2104
HAP69D	J3102	77	FO1506	J3105	09	FO2104	J3118	11	FO2104
HAP70D	J3102	78	FO1506	J3105	01	FO2104	J3118	18	FO2104
HAP71D	J3102	79	FO1506	J3105	80	FO2104	J3118	23	FO2104
HAP72D	J3102	80	FO1506	J3105	72	FO2104	J3118	04	FO2104
HBB53A	J3119	05	FO0100					
HBFABD1	J3106	51	FO1802	J3106	51	FO1900		
HBFACD1	J3106	40	FO1802	J3106	40	FO1900		
HBFACOV	J3106	80	FO1802	J3106	80	FO1900		
HBFABD1	J3106	54	FO1802	J3106	54	FO1900		
HBFAEO	J3119	26	FO1802	J3119	26	FO1900		
HBFAGA	J3110	72	FO1802	J3110	75	FO2001		
HBFAJS	J3108	72	FO1802	J3108	75	FO2002		
HBFAKS	J3109	72	FO1802	J3109	75	FO2002		
HBFBRD1	J3107	68	FO2200	J3107	68	FO2001	J3108	68	FO2001
	J3109	68	FO2001	J3110	68	FO2001	J3111	68	FO2002
	J3112	68	FO2002	J3113	68	FO2002		
	J3114	68	FO2002	J3115	68	FO2002	J3116	68	FO2002
	J3117	68	FO2002	J3118	68	FO2002		
HBFVSD1	J3119	06	FO1802	J3119	59	FO1900		
HBJAPOV	J3111	75	FO1700	J3111	75	FO2300		
HBJAROV	J3116	75	FO1700	J3116	75	FO2300		
HBJ00OV	J3120	29	FO1101	J3121	29	FO1102	J3122	29	FO1103
	J3123	29	FO1104	J3124	29	FO1105	J3125	29	FO1106
	J3126	29	FO1107	J3127	27	FO1108	J3127	29	FO0300
	J3127	29	FO1108					
HBJ01OV	J3120	31	FO1101	J3121	31	FO1102	J3122	31	FO1103
	J3123	31	FO1104	J3124	31	FO1105	J3125	31	FO106
	J3126	31	FO1107	J3126	48	FO1107	J3127	31	FO0300
	J3127	31	FO1108					
HBJ02OV	J3120	80	FO1101	J3121	80	FO1102	J3123	80	FO1104
	J3124	63	FO1105	J3124	80	FO1105	J3125	80	FO1106
	J3126	80	FO1107	J3127	80	FO0300	J3127	80	FO1108

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution								
HBJ03OV	J3120	43	FO1101	J3121	43	FO1102	J3122	43	FO1103
	J3123	43	FO1104	J3124	43	FO1105	J3125	43	FO1106
	J3125	63	FO1106	J3126	43	FO1107	J3127	43	FO0300
	J3127	43	FO1108						
HBJ04OV	J3120	27	FO1101	J3121	27	FO1102	J3122	27	FO1103
	J3123	27	FO1104	J3124	27	FO1105	J3125	27	FO1106
	J3126	27	FO0300						
HBJ05OV	J3120	48	FO1101	J3121	48	FO1102	J3122	48	FO1103
	J3123	48	FO1104	J3124	48	FO1105	J3125	48	FO0300
	J3125	48	FO1106						
HBJ06OV	J3120	63	FO1101	J3121	63	FO1102	J3122	63	FO1103
	J3123	45	FO0300	J3123	45	FO1104			
HBJ07OV	J3120	17	FO1101	J3121	17	FO1102	J3122	17	FO1103
	J3123	17	FO0300	J3123	17	FO1104			
HBJ08OV	J3126	63	FO1107	J3127	48	FO0300	J3127	48	FO1108
HBKADOV	J3119	19	FO1803	J3119	19	FO1900			
HBKAPOV	J3119	31	FO1803	F3119	31	FO1900			
HBLAGA	J3107	72	FO2001	J3107	75	FO2001	J3107	75	FO1300
HBMY1AV	J3107	76	FO0400	J3107	76	FO2300			
HBMY2AV	J3108	76	FO0400	J3108	76	FO2300			
HBMY3AV	J3109	76	FO0400	J3109	76	FO2300			
HBMY4AV	J3110	76	FO0400	J3110	76	FO2300			
HBMY5AV	J3111	76	FO0400	J3111	76	FO2300			
HBMY6AV	J3112	76	FO0400	J3112	76	FO2300			
HBUPUO	J3106	62	FO2700						
HBWAYO	J3119	62	FO1600	J3119	62	FO1900			
HBWAZO	J3119	65	FO1600	J3119	65	J01900			
HBWBAOV	J3119	55	FO1600	J3119	55	J01900			
HBWBCA	J3106	17	FO1600	J3106	17	J01900			
HBWBCO	J3106	21	FO1900	J3119	70	FO1900			
HBWBDA	J3106	13	FO1600	J3106	13	FO1900			
HBWB3S	J3106	07	FO1600	J3106	07	FO1900			
HC+1VDC	*J3106	39	FO2504	J3107	15	FO2101	J3107	15	FO2504
	J3108	15	FO2504	J3109	15	FO2504	J3110	15	FO2504
	J3111	15	FO2504	J3112	15	FO2504	J3113	15	FO2504
	J3114	15	FO2504	J3115	15	FO2504	J3116	15	FO2504

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution								
	J3117	15	FO2504	J3118	15	FO2504	J3119	79	FO2504
	J3119	80	FO2504						
HC+15R1	J3106	75	FO1900						
HC+15VDC	*J3106	48	FO2502	J3106	74	FO2502	J3106	71	FO2502
	J3106	05	FO2502	J3106	36	FO2502	J3106	36	FO1900
	J3106	76	FO2502	J3119	13	FO2504	J3119	14	FO2504
HC+2.OV	J3106	64	FO2504	J3106	66	FO2504	J3105	75	FO2504
	J3104	75	FO2504						
HC+2VDC	*J3106	42	FO2504	J3107	13	FO2101	J3107	13	FO2504
	J3108	13	FO2504	J3109	13	FO2504	J3110	13	FO2504
	J3111	13	FO2504	J3112	13	FO2504	J3113	13	FO2504
	J3114	13	FO2504	J3115	13	FO2504	J3116	13	FO2504
	J3117	13	FO2504	J3118	13	FO2504	J3119	49	FO2504
	J3119	50	FO2504						
HC+5VDC0	J3120	28	FO2502	J3120	30	FO2502			
HC+5VDC1	J3121	28	FO2502	J3121	30	FO2502			
HC+5VDC2	J3122	28	FO2502	J3122	30	FO2502			
HC+5VDC3	J3123	28	FO2502	J3123	30	FO2502			
HC+5VDC4	J3124	28	FO2502	J3124	30	FO2502			
HC+5VDC5	J3125	28	FO2502	J3125	30	FO2502			
HC+5VDC6	J3126	28	FO2502	J3126	30	FO2502			
HC+5VDC7	J3127	28	FO2502	J3127	30	FO2502			
HC+5VDC8	*J3106	10	FO2504	J3106	11	FO2504	J3106	12	FO2504
	J3105	11		J3104	11				
HC-15VDC	*J3106	65	FO2502	*J3106	65	FO2504	J3106	08	FO2502
	J3106	08	FO2504	J3106	45	FO2502	J3106	45	FO2504
	J3106	46	FO2502	J3106	46	FO2504	J3106	73	FO2502
	J3106	73	FO2504	J3119	08	FO2504	J3119	45	FO2504
	J3119	46	FO2504	J3119	73	FO2504			
HC-5VDC	J3107	06	FO2504	J3108	06	FO2504	J3109	06	FO2504
	J3110	06	FO2504	J3111	06	FO2504	J3112	06	FO2504
	J3113	06	FO2504	J3114	06	FO2504	J3115	06	FO2504
	J3116	06	FO2504	J3117	06	FO2504	J3118	06	FO2504
	*J3119	51	FO2504						
HCADOO	*J3107	78	FO2300	J3120	08	FO1101	J3120	38	FO1101
	J3120	60	FO1101	J3121	08	FO1102	J3121	38	FO1102

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution						
	J3121	60	FO1102	J3122	08	FO1103	J3122	38	FO1103
	J3122	60	FO1103	J3123	08	FO1104	J3123	38	FO1104
	J3123	60	FO1104	J3124	38	FO1105	J3124	60	FO1105
	J3125	38	FO1106	J3125	60	FO1106	J3126	38	FO1107
	J3126	60	FO1107	J3127	38	FO1108	J3127	60	FO1108
HCAD1O	*J3108	78	FO2300	J3120	09	FO1101	J3120	35	FO1101
	J3120	61	FO1101	J3121	09	FO1102	J3121	35	FO1102
	J3121	61	FO1102	J3122	09	FO1103	J3122	35	FO1103
	J3122	61	FO1103	J3123	09	FO1104	J3123	35	FO1104
	J3123	61	FO1104	J3124	35	FO1105	J3124	61	FO1105
	J3125	35	FO1106	J3125	61	FO1106	J3126	35	FO1107
	J3126	61	FO1107	J3127	35	FO1108	J3127	61	FO1108
HCAD2O	*J3109	78	FO2300	J3120	10	FO1101	J3120	39	FO1101
	J3120	62	FO1101	J3121	10	FO1102	J3121	39	FO1102
	J3121	62	FO1102	J3122	10	FO1103	J3122	39	FO1103
	J3122	62	FO1103	J3123	10	FO1104	J3123	39	FO1104
	J3123	62	FO1104	J3124	39	FO1105	J3124	62	FO1105
	J3125	39	FO1106	J3125	62	FO1106	J3126	39	FO1107
	J3126	62	FO1107	J3127	39	FO1108	J3127	62	FO1108
HCAD3O	J3110	78	FO2300	J3120	18	FO1101	J3120	36	FO1101
	J3120	64	FO1101	J3121	18	FO1102	J3121	36	FO1102
	J3121	64	FO1102	J3122	18	FO1103	J3122	36	FO1103
	J3122	64	FO1103	J3123	18	FO1104	J3123	36	FO1104
	J3123	64	FO1104	J3124	36	FO1105	J3124	64	FO1105
	J3125	36	FO1106	J3125	64	FO1106	J3126	36	FO1107
	J3126	64	FO1107	J3127	36	FO1108	J3127	64	FO1108
HCAD4O	*J3111	78	FO2300	J3120	23	FO1101	J3120	40	FO1101
	J3120	70	FO1101	J3121	23	FO1102	J3121	40	FO1102
	J3121	70	FO1102	J3122	23	FO1103	J3122	40	FO1103
	J3122	70	FO1103	J3123	23	FO1104	J3123	40	FO1104
	J3123	70	FO1104	J3124	40	FO1105	J3124	70	FO1105
	J3125	40	FO1106	J3125	70	FO1106	J3126	40	FO1107
	J3126	70	FO1107	J3127	40	FO1108	J3127	70	FO1108
HCAD5O	*J3112	78	FO2300	J3120	24	FO1101	J3120	37	FO1101
	J3120	72	FO1101	J3121	24	FO1102	J3121	37	FO1102
	J3121	72	FO1102	J3122	24	FO1103	J3122	37	FO1103

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*Table 7-9. Analog Assembly Key Signal Lookup
-Continued*

Signal	Distribution								
	J3122	72	FO1103	J3123	24	FO1104	J3123	37	FO1104
	J3123	72	FO1104	J3124	37	FO1105	J3124	72	FO1105
	J3125	37	FO1106	J3125	72	FO1106	J3126	37	FO1107
	J3126	72	FO1107	J3127	37	FO1108	J3127	72	FO1108
HCCH1O	J3111	52	FO2102	J3118	52	FO2104	*J3124	01	FO1105
HCCH2O	J3113	75	FO2002	J3114	75	FO2002	*J3124	03	FO1105
HCCH3O	J3109	52	FO2102	J3113	52	FO2103	J3115	52	FO2103
	J3117	52	FO2104	*J3124	04	FO1105			
HCCR1A	*J3107	63	FO2101	J3107	64	FO2001	*J3108	63	FO2102
	*J3109	62	FO2102						
HCCR2A	J3107	61	FO2001	*J3109	63	FO2102	*J3110	63	FO2102
	*J3111	62	FO2102	*J3112	62	FO2103			
HCCR3A	J3108	64	FO2001	*J3110	62	FO2102	*J3111	63	FO2102
	*J3112	63	FO2103	*J3113	62	FO2103	*J3114	62	FO2103
HCCR4A	J3108	61	FO2001	*J3113	63	FO2103	*J3114	63	FO2103
	*J3115	62	FO2103	*J3116	62	FO2104			
HCCR5A	J3109	64	FO2001	*J3115	63	FO2103	*J3116	63	FO2104
	*J3117	62	FO2104	*J3118	62	FO2104			
HCCR6A	J3109	61	FO2001	*J3117	63	FO2104	*J3118	63	FO2104
HCC01A	*J3107	77	FO2101	*J3107	77	FO2403			
HCC02A	*J3107	79	FO2101	*J3107	79	FO2403			
HCC03A	*J3107	80	FO2101	*J3107	80	FO2403			
HCC04A	*J3107	66	FO2101	*J3107	66	FO2403			
HCC05A	*J3107	56	FO2101	*J3107	56	FO2403			
HCC06A	*J3107	65	FO2101	*J3107	65	FO2043			
HCC07A	*J3108	77	FO2102	*J3108	77	FO2403			
HCC08A	*J3108	79	FO2102	*J3108	79	FO2403			
HCC09A	*J3108	80	FO2102	*J3108	80	FO2403			
HCC10A	*J3108	66	FO2102	*J3108	66	FO2403			
HCC11A	*J3108	56	FO2102	*J3108	56	FO2403			
HCC12A	*J3108	65	FO2102	*J3108	65	FO2403			
HCC13A	*J3109	77	FO2102	*J3109	77	FO2403			
HCC14A	*J3109	79	FO2102	*J3109	79	FO2403			
HCC15A	*J3109	80	FO2102	*J3109	80	FO2403			
HCC16A	*J3109	66	FO2102	*J3109	66	FO2403			
HCC17A	*J3109	56	FO2102	*J3109	56	FO2403			

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution						
	*J3110	77	FO2102				
HCC18A	*J3109	65	FO2102	*J3109	65	FO2403	
HCC20A	*J3110	79	FO2102	*J3110	79	FO2403	
HCC21A	*J3110	65	FO2102	*J3110	65	FO2403	
HCC22A	*J3110	66	FO2102	*J3110	66	FO2403	
HCC23A	*J3110	56	FO2102	*J3110	56	FO2403	
HCC24A	*J3110	80	FO2102	*J3110	80	FO2403	
HCC25A	*J3111	77	FO2102	*J3111	77	FO2403	
HCC26A	*J3111	79	FO2102	*J3111	79	FO2403	
HCC27A	*J3111	80	FO2102	*J3111	80	FO2403	
HCC28A	*J3111	66	FO2102	*J3111	66	FO2403	
HCC29A	*J3111	56	FO2102	*J3111	56	FO2403	
HCC30A	*J3111	65	FO2102	*J3111	65	FO2403	
HCC31A	*J3112	77	FO2103	*J3112	77	FO2403	
HCC32A	*J3112	79	FO2103	*J3112	79	FO2403	
HCC33A	*J3112	80	FO2103	*J3112	80	FO2403	
HCC34A	*J3112	66	FO2103	*J3112	66	FO2403	
HCC35A	*J3112	56	FO2103	*J3112	56	FO2403	
HCC36A	*J3112	65	FO2103	*J3112	65	FO2403	
HCC37A	*J3113	77	FO2103	*J3113	77	FO2403	
HCC38A	*J3113	79	FO2103	*J3113	79	FO2403	
HCC39A	*J3113	80	FO2103	*J3113	80	FO2403	
HCC40A	*J3113	66	FO2103	*J3113	66	FO2401	
HCC41A	*J3113	56	FO2103	*J3113	56	FO2403	
HCC42A	*J3113	65	FO2103	*J3113	65	FO2403	
HCC43A	*J3114	77	FO2103	*J3114	77	FO2403	
HCC44A	*J3114	79	FO2103	*J3114	79	FO2403	
HCC45A	*J3114	80	FO2103	*J3114	80	FO2403	
HCC46A	*J3114	66	FO2103	*J3114	66	FO2403	
HCC47A	*J3114	56	FO2103	*J3114	56	FO2403	
HCC48A	*J3114	65	FO2103	*J3114	65	FO2403	
HCC49A	*J3115	77	FO2103	*J3115	77	FO2403	
HCC50A	*J3115	79	FO2103	*J3115	79	FO2403	
HCC51A	*J3115	80	FO2103	*J3115	80	FO2403	
HCC52A	*J3115	66	FO2103	*J3115	66	FO2403	
HCC53A	*J3115	56	FO2103	*J3115	56	FO2403	

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution							
HCC54A	*J3115	65	FO2103	*J3115	65	FO2403		
HCC55A	*J3116	77	FO2104	*J3116	77	FO2403		
HCC56A	*J3116	79	FO2104	*J3116	79	FO2403		
HCC57A	*J3116	80	FO2104	*J3116	80	FO2403		
HCC58A	*J3116	66	FO2104	*J3116	66	FO2403		
HCC59A	*J3116	56	FO2104	*J3116	56	FO2403		
HCC60A	*J3116	65	FO2104	*J3116	65	FO2403		
HCC61A	*J3117	77	FO2104	*J3117	77	FO2403		
HCC62A	*J3117	79	FO2104	*J3117	79	FO2403		
HCC63A	*J3117	80	FO2104	*J3117	80	FO2403		
HCC64A	*J3117	66	FO2104	*J3117	66	FO2403		
HCC65A	*J3117	56	FO2104	*J3117	56	FO2403	*J3117 56	FO2503
HCC66A	*J3117	65	FO2104	*J3117	65	FO2403		
HCC67A	*J3118	77	FO2104	*J3118	77	FO2403		
HCC68A	*J3118	79	FO2104	*J3118	79	FO2403		
HCC69A	*J3118	80	FO2104	*J3118	80	FO2403		
HCC70A	*J3118	66	FO2104	*J3118	66	FO2403		
HCC71A	*J3118	56	FO2104	*J3118	56	FO2403		
HCC72A	*J3118	65	FO2104	*J3118	65	FO2403		
HCDNRGA	*J3106	56	FO1900					
HCD00O	*J3120	01	FO1101	*J3120	13	FO1101	*J3120 46	FO1101
	*J3120	49	FO1101	*J3120	59	FO1101	*J3126 49	FO1107
	*J3126	49	FO1101					
HCD01O	*J3120	03	FO1101	*J3120	11	FO1101	*J3120 47	FO1101
	*J3120	50	FO1101	*J3120	57	FO1101	*J3126 50	FO1101
	*J3126	50	FO1107					
HCD020	*J3120	04	FO1101	*J3120	15	FO1101	*J3120 51	FO1101
	*J3120	56	FO1101	*J3120	74	FO1101	*J3126 51	FO1101
	*J3126	51	FO1107					
HCDO30	*J3120	05	FO110I	*J3120	14	FO1101	*J3120 52	FO1101
	*J3120	55	FO1101	*J3120	75	FO1101	J3126 52	FO1101
	J3126	52	FO1107					
HCD040	*J3120	06	FO1101	*J3120	22	FO1101	*J3120 53	FO1101
	*J3120	65	FO1101	*J3120	76	FO1101	*J3126 53	FO1101
	*J3126	53	FO1107					
HCD050	*J3120	07	FO1101	*J3120	19	FO1101	*J3120 54	FO1101

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution					
	*J3120 66	FO1101	*J3120 77	FO1110	*J3126 54	FO1101
	*J3126 54	FO1107				
HCD06O	*J3120 21	FO1101	*J3120 25	FO1101	*J3120 68	FO1101
	*J3120 71	FO1101	*J3120 78	FO1101	*J3126 71	FO1101
	*J3126 71	FO1107				
HCD07O	*J3120 20	FO1101	*J3120 26	FO1101	*J3120 69	FO1101
	*J3120 73	FO1101	*J3120 79	FO1101	*J3126 73	FO1101
	*J3126 73	FO1107				
HCD08O	*J3121 01	FO1102	*J3121 13	FO1102	*J3121 46	FO1102
	*J3121 49	FO1102	*J3121 59	FO1102	*J3127 46	FO1102
	*J3127 46	FO1108				
HCD09O	*J3121 03	FO1102	*J3121 11	FO1102	*J3121 47	FO1102
	*J3121 50	FO1102	*J3121 57	FO1102	*J3172 47	FO1102
	*J3127 47	FO1108				
HCD10O	*J3121 04	FO1102	*J3121 15	FO1102	J3121 51	FO1102
	*J3121 56	FO1102	*J3121 74	FO1102	*J3127 74	FO1102
	*J3127 74	FO1108				
HCD11O	*J3121 05	FO1102	*J3121 14	FO1102	*J3121 52	FO1102
	*J3121 55	FO1102	*J3121 75	FO1102	*J3127 75	FO1102
	*J3127 75	FO1108				
HCD12O	*J3121 06	FO1102	*J3121 22	FO1102	*J3121 53	FO1102
	*J3121 65	FO1102	*J3121 76	FO1102	*J3127 76	FO1102
	*J3127 76	FO1108				
HCD13O	*J3121 07	FO1102	*J3121 19	FO1102	*J3121 54	FO1102
	*J3121 66	FO1102	*J3121 77	FO1102	*J3127 77	FO1102
	*J3127 77	FO1108				
HCD14O	*J3121 21	FO1102	*J3121 25	FO1102,	*J3121 68	FO1102
	*J3121 71	FO1102	*J3121 78	FO1102	*J3127 78	FO1102
	*J3127 78	FO1108				
HCD15O	*J3121 20	FO1102	*J3121 26	FO1102	*J3121 69	FO1102
	*J3121 73	FO1102	*J3121 79	FO1102	*J3127 79	FO1108
	*J3127 79	FO1102				
HCD16O	*J3122 01	FO1103	*J3122 13	FO1103	*J3122 46	FO1103
	*J3122 49	FO1103	*J3122 59	FO1103	*J3127 49	FO1108
	*J3127 49	FO1103				
HCD17O	*J3122 03	FO1103	*J3122 11	FO1103	*J3122 47	FO1103

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution								
	*J3122	50	FO1103	*J3122	57	FO1103	*J3127	50	FO1108
	*J3127	50	FO1103						
HCD18O	*J3122	04	FO1103	*J3122	15	FO1103	*J3122	51	FO1103
	*J3122	56	FO1103	*J3122	74	FO1103	*J3127	51	FO1108
	*J3127	51	FO1103						
HCD19O	J3122	05	FO1103	*J3122	14	FO1103	*J3122	52	FO1103
	*J3122	55	FO1103	*J3122	75	FO1103	*J3127	52	FO1108
	*J3127	52	FO1103						
HCD20O	*J3122	06	FO1103	*J3122	22	FO1103	*J3122	53	FO1103
	*J3122	65	FO1103	*J3122	76	FO1103	*J3127	53	FO1108
	*J3127	53	FO1103						
HCD21O	*J3122	07	FO1103	*J3122	19	FO1103	*J3122	54	FO1103
	*J3122	66	FO1103	*J3122	77	FO1103	*J3127	54	FO1108
	*J3127	54	FO1103						
HCD22O	*J3122	21	FO1103	*J3122	25	FO1103	*J3122	68	FO1103
	*J3122	71	FO1103	*J3122	78	FO1103	*J3127	71	FO1108
	*J3127	71	FO1103						
HCD23O	*J3122	20	FO1103	*J3122	26	FO1103	*J3122	69	FO1103
	*J3122	73	FO1103	*J3122	79	FO1103	*J3127	73	FO1108
	*J3127	73	FO1103						
HCD24O	*J3123	01	FO1104	*J3123	13	FO1104	*J3123	46	FO1104
	*J3121	49	FO1104	*J3123	59	FO1104			
HCD25O	*J3123	03	FO1104	*J3123	11	FO1104	*J3123	47	FO1104
	*J3123	50	FO1104	*J3123	57	FO1104			
HCD26O	*J3123	04	FO1104	*J3123	15	FO1104	*J3123	51	FO1104
	*J3123	56	FO1104	*J3123	74	FO1104			
HCD27O	*J3123	05	FO1104	*J3123	14	FO1104	*J3123	52	FO1104
	*J3123	55	FO1104	*J3123	75	FO1104			
HCD28O	*J3123	06	FO1104	*J3123	22	FO1104	*J3123	53	FO1104
	J3123	65	FO1104	*J3123	76	FO1104			
HCD29O	*J3123	07	FO1104	*J3123	19	FO1104	*J3123	54	FO1104
	*J3123	66	FO1104	*J3123	77	FO1104			
HCD30O	*J3123	21	FO1104	*J3123	25	FO1104	*J3123	68	FO1104
	*J3123	71	FO1104	*J3123	78	FO1104			
HCD31O	*J3123	20	FO1104	*J3123	26	FO1104	*J3123	69	FO1104
	*J3123	73	FO1104	*J3123	79	FO1104			

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution							
HCD32O	*J3124	13	FO1105	*J3124	46	FO1105	*J3124	59	FO1105
HCD33O	*J3124	11	FO1105	*J3124	47	FO1105	*J3124	57	FO1105
HCD34O	*J3124	15	FO1105	*J3124	56	FO1105	*J3124	74	FO1105
HCD35O	*J3124	14	FO1105	*J3124	55	FO1105	*J3124	75	FO1105
HCD36O	*J3124	22	FO1105	*J3124	65	FO1105	*J3124	76	FO1105
HCD37O	*J3124	19	FO1105	*J3124	66	FO1105	*J3124	77	FO1105
HCD38O	*J3124	21	FO1105	*J3124	68	FO1105	*J3124	78	FO1105
HCD39O	*J3124	20	FO1105	*J3124	69	FO1105	*J3124	79	FO1105
HCD40O	*J3125	13	FO1106	*J3125	46	FO1106	*J3125	59	FO1106
HCD41O	*J3125	11	FO1106	*J3125	47	FO1106	*J3125	57	FO1106
HCD42O	*J3125	15	FO1106	*J3125	56	FO1106	*J3125	74	FO1106
HCD43O	*J3125	14	FO1106	*J3125	55	FO1106	*J3125	75	FO1106
HCD44O	*J3125	22	FO1106	*J3125	65	FO1106	*J3125	76	FO1106
HCD45O	*J3125	19	FO1106	*J3125	66	FO1106	*J3125	77	FO1106
HCD46O	*J3125	21	FO1106	*J3125	68	FO1106	*J3125	78	FO1106
HCD47O	*J3125	20	FO1106	*J3125	69	FO1106	*J3125	79	FO1106
HCD48O	*J3126	13	FO1107	*J3126	59	FO1107		
HCD49O	*J3126	11	FO1107	*J3126	57	FO1107		
HCD50O	*J3126	15	FO1107	*J3126	56	FO1107		
HCD51O	*J3126	14	FO1107	*J3126	55	FO1107		
HCD52O	*J3126	22	FO1107	*J3126	65	FO1107		
HCD53O	*J3126	19	FO1107	*J3126	66	FO1107		
HCD54O	*J3126	21	FO1107	*J3126	68	FO1107		
HCD55O	*J3126	20	FO1107	*J3126	69	FO1107		
HCD56O	*J3127	59	FO1108					
HCD57O	*J3127	57	FO1108					
HCD58O	*J3127	56	FO1108					
HCD59O	*J3127	55	FO1108					
HCD60O	*J3127	65	FO1108					
HCD61O	*J3127	66	FO1108					
HCD62O	*J3127	68	FO1108					
HCD63O	*J3127	69	FO1108					
HCD64O	*J3124	49	FO1105	*J3125	49	FO1106	*J3126	46	FO1107
	*J3127	13	FO1108					
HCD65O	*J3124	50	FO1105	*J3125	50	FO1106	*J3126	47	FO1107
	*J3127	11	FO1108					

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution						
HCD66O	*J3124	51	FO1105	*J3125	51	FO1106	*J3126	74	FO1107
	*J3127	15	FO1108						
HCD67O	*J3124	52	FO1105	*J3125	52	FO1106	*J3126	75	FO1107
	*J3127	14	FO1108						
HCD68O	*J3124	53	FO1105	*J3125	53	FO1106	*J3126	76	FO1107
	*J3127	22	FO1108						
HCD69O	*J3124	54	FO1105	*J3125	54	FO1106	*J3126	77	FO1107
	*J3127	19	FO1108						
HCD70O	*J3124	71	FO1105	*J3125	71	FO1106	*J3126	78	FO1107
	*J3127	21	FO1108						
HCD71O	*J3124	73	FO1105	*J3125	73	FO1106	*J3126	79	FO1107
	*J3127	20	FO1108						
HCE01A	*J3107	69	FO2001						
HCE02A	*J3107	74	FO2001						
HCE03A	*J3108	69	FO2001						
HCE04A	*J3108	74	FO2001						
HCE05A	*J3109	69	FO2001						
HCE06A	*J3109	74	FO2001						
HCE07A	*J3110	69	FO2001						
HCE08A	*J3110	74	FO2001						
HCE09A	*J3111	69	FO2002						
HCE10A	*J3111	74	FO2002						
HCE11A	*J3112	69	FO2002						
HCE12A	*J3112	74	FO2002						
HCE13A	*J3113	69	FO2002						
HCE14A	*J3113	74	FO2002						
HCE15A	*J3114	69	FO2002						
HCE16A	*J3114	74	FO2002						
HCE17A	*J3115	69	FO2002						
HCE18A	*J3115	74	FO2002						
HCFAGD1	*J3106	50	FO1900	J3106	69	FO1900	J3106	77	FO1900
HCFAGD1	J3107	31	FO2001	J3108	31	FO2001	J3109	31	FO2001
	*J3110	71	FO2001						
HCFIZ1	*J3110	70	FO2001						
HCFIZ2	*J3110	73	FO2001						
HCFIZ3	*J3111	70	FO2002						

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution								
HCFIZ4	*J3111	73	FO2002						
HCFIZ5	*J3112	70	FO2002						
HCFIZ6	*J3112	73	FO2002						
HCFM1O	J3113	70	FO2002	*J3108	71	FO2002			
HCFM2O	*J3109	71	FO2002	J3113	73	FO2002			
HCFOZ1	*J3113	70	FO2002						
HCFOZ2	*J3113	73	FO2002						
HCFOZ3	*J3114	70	FO2002						
HCFOZ4	*J3114	73	FO2002						
HCFOZ5	*J3115	70	FO2002						
HCFOZ6	*J3115	73	FO2002						
HCFP5O	*J3106	33	FO1900	*J3106	33	FO2402			
HCFS1A	*J3107	71	FO2001	J3110	31	FO2001	J3111	31	FO2002
	J3112	31	FO2002	J3113	31	FO2002	J3114	31	FO2002
	J3115	31	FO2002						
HCF01A	*J3107	48	FO2101	*J3108	48	FO2102	J3109	51	FO2102
	J3113	64	FO2002						
HCF01O	*J3107	27	FO2101	*J3107	27	FO2403			
HCF02A	*J3109	48	FO2102	*J3109	48	FO2101	*J3110	48	FO2102
	*J3111	51	FO2103	*J3112	51	FO2103	J3113	61	FO2002
	J3113	71	FO2002						
HCF02O	*J3107	60	FO2101	*J3107	60	FO2304			
HCF03A	J3110	51	FO2102	J3111	48	FO2102	J3112	48	FO2103
	J3113	51	FO2103	J3114	51	FO2002	J3114	64	FO2002
HCF03O	*J3107	34	FO2101	*J3107	34	FO2403			
HCF04A	*J3113	48	FO2103	*J3114	48	FO2103	J3114	61	FO2002
	J3114	71	FO2002	*J3115	51	FO2103	*J3116	51	FO2104
HCF04O	*J3107	38	FO2101	*J3107	38	FO2403			
HCF05A	*J3115	48	FO2103	*J3115	64	FO2002	*J3116	48	FO2104
	*J3117	51	FO2104	*J3118	51	FO2104			
HCF05O	*J3107	29	FO2101	*J3107	29	FO2403			
HCF06A	J3115	61	FO2002	*J3117	48	FO2104	*J3118	48	FO2104
HCF06O	*J3107	36	FO2101	*J3107	36	FO2403			
HCF07O	*J3108	27	FO2102	*J3108	27	FO2403			
HCF08O	*J3108	60	FO2102	*J3108	60	FO2403			
HCF09O	*J3108	34	FO2102	*J3108	34	FO2403			

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution								
HCF10A1	*J3108	09	FO2102						
HCF10A	*J3108	38	FO2403	*J3108	38	FO2102			
HCF11A	*J3107	46	FO2101	*J3108	46	FO2102	*J3109	49	FO2102
	J3110	64	FO2001						
HCF11O	*J3108	29	FO2102	*J3108	29	FO2403			
HCF12A	*J3109	46	FO2102	*J3110	46	FO2102	J3110	61	FO2001
	*J3111	49	FO2102	*J3112	49	FO2103			
HCF12O	*J3108	36	FO2102	*J3108	36	FO2403			
HCF13A	J3110	49	FO2102	J3111	46	FO2102	J3111	64	FO2002
	*J3112	46	FO2103	*J3113	49	FO2103	*J3114	49	FO2103
HCF13O	J3109	27	FO2403	J3109	27	FO2102			
HCF14A	J3111	61	FO2002	*J3113	46	FO2103	*J3114	46	FO2103
	*J3115	49	FO2103	*J3116	49	FO2104			
HCF14O	J3109	60	FO2102	J3109	60	FO2403			
HCF15A	J3112	64	FO2002	*J3115	46	FO2103	*J3116	46	FO2104
	*J3117	49	FO2104	*J3118	49	FO2104			
HCF15O	J3109	34	FO2403	J3109	34	FO2102			
HCF16A	J3112	61	FO2002	*J3117	46	FO2104	*J3118	46	FO2104
HCF16O	*J3109	38	FO2403	*J3109	38	FO2102			
HCF17O	*J3109	29	FO2403	*J3109	29	FO2102			
HCFI8O	*J3109	36	FO2403	*J3109	36	FO2102			
HCF19O	*J3110	27	FO2403	*J3110	27	FO2102			
HCF20O	*J3110	60	FO2403	*J3110	60	FO2102			
HCF21O	*J3110	34	FO2403	*J3110	34	FO2102			
HCF22A1	*J3110	09	FO2102						
HCF22A	J3110	38	FO2102	J3110	38	FO2403			
HCF23O	*J3110	29	FO2403	*J3110	29	FO2102			
HCF24O	*J3110	36	FO2403	*J3110	36	FO2102			
HCF25O	*J3111	27	FO2403	*J3111	27	FO2102			
HCF26O	*J3111	60	FO2403	*J3111	60	FO2102			
HCF27O	*J3111	34	FO2403	*J3111	34	FO2102			
HCF28O	*J3111	38	FO2403	*J3111	38	FO2102			
HCF29O	*J3111	29	FO2403	*J3111	29	FO2102			
HCF30O	*J3111	36	FO2403	*J3111	36	FO2102			
HCF31O	*J3112	27	FO2403	*J3112	27	FO2103			
HCF32A	*J3112	48	FO2103						

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution					
HCF33O	*J3112	34	FO2403	*J3112	34	FO2103
HCF34O	*J3112	38	FO2403	*J3112	38	FO2103
HCF35O	*J3112	29	FO2403	*J3112	29	FO2103
HCF36O	*J3112	36	FO2403	*J3112	36	FO2103
HCF37O	*J3113	27	FO2403	*J3113	27	FO2103
HCF38O	*J3113	60	FO2403	*J3113	60	FO2103
HCF39O	*J3113	34	FO2403	*J3113	34	FO2103
HCF40O	*J3113	38	FO2403	*J3113	38	FO2103
HCF41O	*J3113	29	FO2403	*J3113	29	FO2103
HCF42O	*J3113	36	FO2403	*J3113	36	FO2103
HCF43O	J3114	27	FO2403	*J3114	27	FO2103
HCF44O	*J3114	60	FO2403	J3114	60	FO2103
HCF45O	*J3114	34	FO2403	*J3114	34	FO2103
HCF46O	*J3114	38	FO2403	*J3114	38	FO2103
HCF47O	J3114	29	FO2403	*J3114	29	FO2103
HCF48O	*J3114	36	FO2403	*J3114	36	FO2103
HCF49O	*J3115	27	FO2403	*J3115	27	FO2103
HCF50A	*J3115	48	FO2103			
HCF51O	*J3115	34	FO2403	*J3115	34	FO2103
HCF52O	*J3115	38	FO2403	*J3115	38	FO2103
HCF53O	*J3115	29	FO2403	*J3115	29	FO2103
HCF54O	*J3115	36	FO2403	*J3115	36	FO2103
HCF55O	*J3116	27	FO2403	*J3116	27	FO2104
HCF56O	*J3116	60	FO2403	*J3116	60	FO2104
HCF57O	*J3116	34	FO2403	*J3116	34	FO2104
HCF58O	*J3116	38	FO2403	*J3116	38	FO2104
HCF59O	*J3116	29	FO2403	*J3116	29	FO2104
HCF60O	*J3116	36	FO2403	*J3116	36	FO2104
HCF61O	*J3117	27	FO2403	*J3117	27	FO2104
HCF62O	*J3117	60	FO2403	*J3117	60	FO2104
HCF629A	*J3112	60	FO2103	J3112	72	FO2002	J3112	75	FO2002
HCF629O	*J3112	71	FO2002	*J3113	72	FO2002
HCF63O	*J3117	34	FO2403	*J3117	34	FO2204
HCF64O	*J3117	38	FO2403	*J3117	38	FO2104
HCF65O	*J3117	29	FO2403	*J3117	29	FO2104

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Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution								
HCF66O	*J3117	36	FO2403	*J3117	36	FO2104			
HCF67O	*J3118	27	FO2403	*J3118	27	FO2104			
HCF68O	*J3118	60	FO2403	*J3118	60	FO2104			
HCF69O	*J3118	34	FO2403	*J3118	34	FO2104			
HCF70O	*J3118	38	FO2403	*J3118	38	FO2104			
HCF71O	*J3118	29	FO2403	*J3118	29	FO2104			
HCF72O	*J3118	36	FO2403	*J3118	36	FO2104			
HCGNPU	*J3106	79	FO2502	*J3106	79	FO1900	*J3106	63	FO1900
	*J3106	63	FO2502						
HCGN4D	J3127	63	FO1108	J3127	67				
HCG73	*J3106	32	FO2501						
HCG74	*J3107	16	FO2504						
HCG76	*J3106	67	FO2504						
HCG81	*J3119	16	FO2502	*J3119	16	FO2504			
HCG87	*J3106	44	FO2502	*J3106	44	FO2504			
HCG88	*J3107	02	FO2502	*J3107	02	FO2504			
HCG95	*J3122	02	FO2700						
HCG98	*J3106	16	FO2504						
HCG96	*J3127	16	FO2504						
HCH629A	*J3115	60	FO2103	J3115	72	FO2002	J3115	75	FO2002
HCH629O	J3114	72	FO2002	J3115	71	FO2002			
HCID0O	J3107	01	FO2101	J3108	01	FO2102	J3109	01	FO2102
	J3110	01	FO2102	J3111	01	FO2102	J3112	01	FO2103
	J3113	01	FO2103	*J3113	78	FO2101	*J3113	78	FO2101
	J3114	01	FO2103	J3115	01	FO2103	J3116	01	FO2104
	J3117	01	FO2104	J3118	01	FO2101	J3124	08	FO1105
HCID1O	J3107	03	FO2101	J3108	03	FO2102	J3109	03	FO2102
	J3110	03	FO2102	J3111	03	FO2102	J3112	03	FO2103
	J3113	03	FO2103	J3114	03	FO2103	*J3114	78	FO2101
	*J3114	78	FO2101	J3115	03	FO2103	J3116	03	FO2104
	J3117	03	FO2104	J3118	03	FO2104	J3124	09	FO1105
HCID2O	J3107	10	FO2101	J3108	10	FO2102	J3109	10	FO2102
	J3110	10	FO2102	J3111	10	FO2102	J3112	10	FO2103
	J3113	10	FO2103	J3114	10	FO2103	J3115	10	FO2103
	*J3115	78	FO2101	J3116	10	FO2104	J3117	10	FO2104
	J3118	10	FO2104	J3124	10	FO1105			

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution								
HCID3O	J3107	07	FO2101	J3108	07	FO2102	J3109	07	FO2102
	J3110	07	FO2102	J3111	07	FO2102	J3112	07	FO2103
	J3113	07	FO2103	J3114	07	FO2103	J3115	07	FO2103
	J3116	07	FO2104	*J3116	78	FO2101	J3117	07	FO2104
	J3118	07	FO2104	J3124	18	FO1105			
HCID4O	J3107	08	FO2101	J3108	08	FO2102	J3109	08	FO2102
	J3110	08	FO2102	J3111	08	FO2102	J3112	08	FO2103
	J3113	08	FO2103	J3114	08	FO2103	J3115	08	FO2103
	J3116	08	FO2104	J3117	08	FO2104	*J3117	78	FO2101
	J3118	08	FO2104	J3124	23	FO1105			
HCID5O	J3107	05	FO2101	J3108	05	FO2102	J3109	05	FO2102
	J3110	05	FO2102	J3111	05	FO2102	J3112	05	FO2103
	J3113	05	FO2103	J3114	05	FO2103	J3115	05	FO2103
	J3116	05	FO2104	J3117	05	FO2104	J3118	05	FO2104
	*J3118	78	FO2101	J3124	24	FO1105			
HCJAPD6	*J3111	71	FO2300						
HCJARD6	*J3116	71	FO2300						
HCNRGA	*J3106	52	FO1900						
HCPUFA	*J3118	71	FO1900						
HCPU1O	J3118	72	FO1900	J3119	60	FO1900			
HCPU2O	J3118	75	FO1900	J3119	61	FO1900			
HCP5LO	*J3119	75	FO1900						
HCP5MO	*J3119	65	FO1900						
HCQ1BASE	*J3106	22	FO1900	*J3106	22	FO2502			
HCQ1MTR	J3106	35	FO2502	J3119	77	FO1900			
HCSC+12V	*J3119	48	FO2402	*J3119	48	FO1900			
HCSC15M	J3119	72	FO1900	J3106	37	FO1900			
HCSC+5V	*J3119	43	FO2401	*J3119	43	FO1900			
HCSC-5V	*J3119	78	FO2401	*J3119	78	FO1900			
HCSNS1	*J3119	09	FO1900	*J3119	09	FO2700			
HCSNS2	*J3119	21	FO1900	*J3119	21	FO2700			
HCSNS3	*J3119	37	FO1900	*J3119	37	FO2700			
HCSNS4	*J3119	63	FO1900	*J3119	63	FO2700			
HCSNS5	*J3119	56	FO1900	*J3119	56	FO2700			
HCS12V	*J3106	47	FO1900	*J3106	47	FO2502			
HCTP21O	*J3106	53	FO2600	*J3119	53	FO1900			

Table 7-9. Analog Assembly Key Signal Lookup
-Continued

Signal	Distribution						
HCT15R1	*J3106	75	FO1900				
HCWAEO	J3106	14	FO1900	J3106 53	FO1900		
HC1GND	*J3106	49	FO2700				
HC1OSP	*J3119	07	FO1900				
HC2GND	J3106	01	FO2502	J3106 02	FO2402	J3105 02	FO2502
	J3104	02	FO2504	J3104 58	FO2504	J3105 58	FO2504
HC2OSP	*J3119	33	FO1900				
HC21BO	*J3119	47	FO1900				
HC21CO	*J3119	41	FO1900				
HC3GND	J3119	25	FO2502	J3119 25	FO2504		
HC3GND	J3119	32	FO2502	J3119 32	FO2504		
HC5GND	J3119	57	FO2502	J3119 57	FO2504	J3119 58	FO2502
	J3119	58	FO2504				
HC51LO	*J3119	10	FO1900				
HC51MO	*J3119	24	FO1900				
HC52LO	*J3119	23	FO1900				
HC52MO	*J3119	20	FO1900				
HC53LO	*J3119	39	FO1900				
HC53MO	*J3119	29	FO1900				
HC6GND	J3106	57	FO2502	J3106 57	FO2504	J3106 58	FO2502
	J3106	58	FO2504				
HC602O	*J3106	59	FO1900				

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Table 7-10. MTS Interconnecting Key Signal Lookup

Signal	Distribution														
HACWAOV	P3106	06	P2136	78	FO1900										
HADAAO	J07	035	P3107	21	FO1501	J07	035	P2106	06	FO1501	J07	035	P2106	06	FO2403
HADABO	J07	036	P3107	22	FO1501	J07	036	P2106	01	FO1501	J07	036	P2106	01	FO2403
HADACO	J07	037	P3107	19	FO1501	J07	037	P2106	09	FO1501	J07	037	P2106	09	FO2403
HADADO	J07	038	P3107	20	FO1501	J07	038	P2109	01	FO1501	J07	038	P2109	01	FO2403
HADAEO	J07	039	P2106	15	FO1501	J07	039	P2106	15	FO2403	J07	039	P3107	24	FO1501
HADAFO	J07	040	P3107	17	FO1501	J07	040	P2109	15	FO1501	J07	040	P2109	15	FO2403
HADAGO	J07	041	P2109	22	FO1502	J07	041	P2109	22	FO2403	J07	041	P3108	21	FO1502
HADAHO	J07	042	P2109	14	FO1502	J07	042	P2109	14	FO2403	J07	042	P3108	22	FO1502
HADAIO	J07	043	P3108	19	FO1502	J07	043	P2109	21	FO1502	J07	043	P2109	21	FO2403
HADAJO	J07	044	P3108	20	FO1502	J07	044	P2106	52	FO1502	J07	044	P2106	52	FO2403
HADAKO	J07	045	P3108	24	FO1502	J07	045	P2106	46	FO1502	J07	045	P2106	46	FO2403
HADALO	J07	046	P3108	17	FO1502	J07	046	P2106	45	FO1502	J07	046	P2106	45	FO2403
HADAMO	J07	047	P3109	21	FO1501	J07	047	P2106	66	FO1501	J07	047	P2106	66	FO2403
HADANO	J07	048	P2106	60	FO1501	J07	048	P2106	60	FO2403	J07	048	P3109	22	FO1501
HADAPO	J07	049	P2109	52	FO1501	J07	049	P2109	52	FO2403	J07	049	P3109	19	FO1501
HADAQO	J07	050	P3109	20	FO1501	J07	050	P2109	46	FO1501	J07	050	P2109	46	FO2403
HADARO	J07	051	P2109	66	FO1501	J07	051	P2109	66	FO2403	J07	051	P3110	21	FO1501
HADASO	J07	052	P3109	17	FO1501	J07	052	P2109	60	FO1501	J07	052	P2109	60	FO2403
HADATO	J07	053	P2109	57	FO1502	J07	053	P2109	57	FO2403	J07	053	P3109	24	FO1502
HADAUO	J07	054	P2109	63	FO1502	J07	054	P2109	63	FO2403	J07	054	P3110	22	FO1502
HADBAO	J07	055	P2106	75	FO1502	J07	055	P2106	75	FO2403	J07	055	P3110	17	FO1502
HADBBO	J07	056	P2106	72	FO1502	J07	056	P2106	72	FO2403	J07	056	P3110	20	FO1502
HADBCO	J07	057	P3110	24	FO1502	J07	057	P2106	69	FO1502	J07	057	P2106	69	FO2403
HADBDO	J07	058	P2109	75	FO1502	J07	058	P2109	75	FO2403	J07	058	P3110	19	FO1502
HADBEO	J07	059	P3111	19	FO1503	J07	059	P2111	06	FO1503	J07	059	P2111	06	FO2403
HADBFO	J07	060	P3111	22	FO1503	J07	060	P2111	01	FO1503	J07	060	P2111	01	FO2403
HADBGO	J07	061	P2111	09	FO1503	J07	061	P2111	09	FO2403	J07	061	P3111	21	FO1503
HADBHO	J07	062	P2111	15	FO1503	J07	062	P2111	15	FO2403	J07	062	P3111	20	FO1503
HADBIO	J07	063	P3111	24	FO1503	J07	063	P2111	22	FO1503	J07	063	P2111	22	FO2403
HADBJO	J07	064	P2111	14	FO1503	J07	064	P2111	14	FO2403	J07	064	P3111	17	FO1503
HADBKO	J07	065	P3112	21	FO1504	J07	065	P2111	21	FO1504	J07	065	P2111	21	FO2403
HADBLO	J07	066	P2111	27	FO1504	J07	066	P2111	27	FO2403	J07	066	P3112	22	FO1504
HADBMO	J07	067	P3112	19	FO1504	J07	067	P2111	38	FO1504	J07	067	P2111	38	FO2403
HADBNO	J07	068	P2111	30	FO1504	J07	068	P2111	30	FO2403	J07	068	P3112	20	FO1504
HADBPO	J07	069	P3112	24	FO1504	J07	069	P2111	33	FO1504	J07	069	P2111	33	FO2403
HADBQO	J07	070	P2111	39	FO1504	J07	070	P2111	39	FO2403	J07	070	P3112	17	FO1504

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution														
HADBRO	J07	071	P3113	21	FO1503	J07	071	P2111	52	FO1503	J07	071	P2111	52	FO2403
HADBSO	J07	072	P2111	46	FO1503	J07	072	P2111	46	FO2403	J07	072	P3113	22	FO1503
HADBTO	J07	073	P3113	19	FO1503	J07	073	P2111	45	FO1503	J07	073	P2111	45	FO2403
HADBUO	J07	074	P2111	51	FO1503	J07	074	P2111	51	FO2403	J07	074	P3113	20	FO1503
HADBVO	J07	075	P3113	24	FO1503	J07	075	P2111	66	FO1503	J07	075	P2111	66	FO2403
HADBWO	J07	076	P2111	60	FO1503	J07	076	P2111	60	FO2403	J07	076	P3113	17	FO1503
HADCAO	J07	077	P3114	21	FO1504	J07	077	P2111	57	FO1504	J07	077	P2111	57	FO2403
HADCBO	J07	078	P2111	63	FO1504	J07	078	P2111	63	FO2403	J07	078	P3114	22	FO1504
HADCCO	J07	079	P3114	19	FO1504	J07	079	P2111	75	FO1504	J07	079	P2111	75	FO2403
HADCDO	J07	080	P2111	72	FO1504	J07	080	P2111	72	FO2403	J07	080	P3114	20	FO1504
HADCEO	J07	081	P3114	24	FO1504	J07	081	P2111	69	FO1504	J07	081	P2111	69	FO2403
HADCFO	J07	082	P2111	80	FO1504	J07	082	P2111	80	FO2403	J07	082	P3114	17	FO1504
HADCGO	J07	083	P3115	21	FO1505	J07	083	P2115	06	FO1505	J07	083	P2115	06	FO2403
HADCHO	J07	084	P2115	01	FO1505	J07	084	P2115	01	FO2403	J07	084	P3115	22	FO1505
HADCIO	J07	085	P3115	19	FO1505	J07	085	P2115	09	FO1505	J07	085	P2115	09	FO2403
HADCJO	J07	086	P2115	15	FO1505	J07	086	P2115	15	FO2403	J07	086	P3115	20	FO1505
HADCKO	J07	087	P3115	24	FO1505	J07	087	P2115	22	FO1505	J07	087	P2115	22	FO2403
HADCLO	J07	088	P2115	14	FO1505	J07	088	P2115	14	FO2403	J07	088	P3115	17	FO1505
HADCMO	J07	089	P3116	21	FO1506	J07	089	P2115	21	FO1506	J07	089	P2115	21	FO2403
HADCNO	J07	090	P2115	27	FO1506	J07	090	P2115	27	FO2403	J07	090	P3116	22	FO1506
HADCPO	J07	091	P3116	19	FO1506	J07	091	P2115	38	FO1506	J07	091	P2115	38	FO2403
HADCQO	J07	092	P2115	30	FO1506	J07	092	P2115	30	FO2403	J07	092	P3116	20	FO1506
HADCRO	J07	093	P3116	24	FO1506	J07	093	P2115	33	FO1506	J07	093	P2115	33	FO2403
HADCSO	J07	094	P2115	39	FO1506	J07	094	P2115	39	FO2403	J07	094	P3116	17	FO1506
HADCTO	J07	095	P3117	21	FO1505	J07	095	P2115	52	FO1505	J07	095	P2115	52	FO2403
HADCUO	J07	096	P3117	22	FO1505	J07	096	P2115	46	FO1505	J07	096	P2115	46	FO2403
HADCVO	J07	097	P3117	19	FO1505	J07	097	P2115	45	FO1505	J07	097	P2115	45	FO2403
HADCWO	J07	098	P3117	20	FO1505	J07	098	P2115	51	FO1505	J07	098	P2115	51	FO2403
HADCXO	J07	099	P3117	24	FO1505	J07	099	P2115	66	FO1505	J07	099	P2115	66	FO2403
HADCYO	J07	100	P3117	17	FO1505	J07	100	P2115	60	FO1505	J07	100	P2115	60	FO2403
HADCZO	J07	101	P3118	21	FO1506	J07	101	P2115	57	FO1506	J07	101	P2115	57	FO2403
HADDAO	J07	102	P3118	22	FO1506	J07	102	P2115	63	FO1506	J07	102	P2115	63	FO2403
HADDBO	J07	103	P3118	19	FO1506	J07	103	P2115	75	FO1506	J07	103	P2115	75	FO2403
HADDCO	J07	104	P3118	20	FO1506	J07	104	P2115	72	FO1506	J07	104	P2115	72	FO2403
HADDDO	J07	105	P3118	24	FO1506	J07	105	P2115	69	FO1506	J07	105	P2115	69	FO2403
HADDEO	J07	106	P3118	17	FO1506	J07	106	P2115	80	FO1506	J07	106	P2115	80	FO2403

Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution			
HAGM1A	P2106	51	P3105	41 FO0604
HAGM2A	P2109	30	P3105	59 FO0605
HAGM4A	P2109	51	P3105	69 FO0605
HAG01A	P2124	35	P3104	22 FO0601
HAG02A	P2124	36	P3104	30 FO0601
HAG03A	P2124	29	P3104	23 FO0601
HAG05A	P2124	39	P3104	39 FO0601
HAG06A	P2124	52	P3104	40 FO0601
HAG07A	P2124	47	P3104	32 FO0601
HAG09A	P2124	41	P3104	43 FO0601
HAG10A	P2124	45	P3104	59 FO0601
HAG11A	P2124	51	P3104	49 FO0601
HAG12A	P2124	64	P3104	48 FO0601
HAG13A	P2124	61	P3104	53 FO0601
HAG16A	P2124	59	P3104	63 FO0601
HAG18A	P2124	79	P3104	19 FO0602
HAG19A	P2124	73	P3104	20 FO0602
HAG20A	P2124	69	P3104	18 FO0602
HAG21A	P2124	74	P3104	21 FO0602
HAG22A	P2124	76	P3104	28 FO0602
HAG23A	P2124	75	P3104	31 FO0602
HAG24A	P2128	75	P3104	38 FO0602
HAG25A	P2128	22	P3104	41 FO0602
HAG27A	P2128	20	P3104	51 FO0602
HAG28A	P2128	17	P3104	52 FO0602
HAG30A	P2128	27	P3104	60 FO0602
HAG31A	P2128	38	P3104	67 FO0602
HAG32A	P2128	35	P3104	62 FO0602
HAG33A	P2128	36	P3104	13 FO0603
HAG35A	P2128	33	P3104	68 FO0603
HAG36A	P2128	39	P3104	69 FO0603
HAG37A	P2128	52	P3105	22 FO0603
HAG38A	P2128	47	P3105	30 FO0603
HAG39A	P2128	50	P3105	23 FO0603
HAG40A	P2128	41	P3105	33 FO0603
HAG42A	P2128	51	P3105	40 FO0603

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution							
HAG43A	P2128	64	P3105	32	FO0603			
HAG44A	P2128	61	P3105	39	FO0603			
HAG45A	P2128	62	P3105	43	FO0603			
HAG47A	P2128	59	P3105	49	FO0603			
HAG49A	P2128	79	P3105	53	FO0604			
HAG51A	P2128	69	P3105	64	FO0604			
HAG52A	P2128	74	P3105	63	FO0604			
HAG54A	P2136	11	P3105	19	FO0604			
HAG55A	P2136	06	P3105	20	FO0604			
HAG56A	P2136	04	P3105	18	FO0604			
HAG57A	P2136	05	P3105	21	FO0604			
HAG58A	P2136	09	P3105	28	FO0604			
HAG59A	P2136	15	P3105	31	FO0604			
HAG60A	P2136	22	P3105	38	FO0604			
HAG62A	P2136	20	P3105	50	FO0604			
HAG63A	P2136	17	P3105	51	FO0604			
HAG64A	P2136	21	P3105	52	FO0604			
HAG67A	P2136	35	P3105	67	FO0605			
HAG68A	P2136	36	P3105	62	FO0605			
HAG70A	P2136	33	P3105	13	FO0605			
HAG71A	P2136	39	P3105	68	FO0605			
HAHA00V	J07	015	P2124	10	FO0701	J07	015 P2124 10	FO2403
HAHA10V	J07	016	P2124	24	FO0701	J07	016 P2124 24	FO2403
HAHA20V	J07	017	P2124	25	FO0701	J07	017 P2124 25	FO2403
HAHA30V	J07	018	P2124	18	FO0701	J07	018 P2124 18	FO2403
HAHA40V	J07	019	P2124	14	FO0701	J07	019 P2124 14	FO2403
HAHA50V	J07	020	P2124	19	FO0701	J07	020 P2124 19	FO2403
HAL04A	P2140	55	P3104	33	FO1507			
HAL08A	P2140	04	P3104	29	FO1507			
HAL14A	P2140	07	P3104	61	FO1507			
HAL15A	P2140	63	P3104	64	FO1507			
HAL17A	P2140	15	P3104	12	FO1507			
HAL26A	P2140	73	P3104	50	FO1507			
HAL29A	P2140	20	P3104	42	FO1507			
HAL34A	P2140	19	P3104	14	FO1507			
HAL41A	P2140	27	P3105	29	FO1507			

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution			
HAL46A	P2140	36	P3105	42 FO1507
HAL48A	P2140	74	P3105	48 FO1507
HAL50A	P2140	31	P3105	61 FO1507
HAL53A	P2140	39	P3105	12 FO1507
HAL66A	P2140	80	P3105	60 FO1507
HAL69A	P2140	50	P3105	14 FO1507
HAP01D	J01	15	P2107	06 FO1501
HAP02D	J01	13	P2107	01 FO1501
HAP03D	J01	09	P2107	09 FO1501
HAP04D	J01	07	P2107	15 FO1501
HAP05D	J01	05	P2107	22 FO1501
HAP06D	J02	37	P2107	14 FO1501
HAP07D	J01	01	P2107	21 FO1502
HAP08D	J01	03	P2107	27 FO1502
HAP09D	J02	39	P2107	38 FO1502
HAP10D	J01	11	P2107	30 FO1502
HAP11D	J02	41	P2107	33 FO1502
HAP12D	J02	43	P2107	39 FO1502
HAP13D	J01	31	P2107	52 FO1501
HAP14D	J02	51	P2107	46 FO1501
HAP15D	J01	27	P2107	45 FO1501
HAP16D	J01	23	P2107	51 FO1501
HAP17D	J01	21	P2107	66 FO1501
HAP18D	J02	47	P2107	60 FO1501
HAP19D	J01	17	P2107	57 FO1502
HAP20D	J01	19	P2107	63 FO1502
HAP21D	J02	45	P2107	75 FO1502
HAP22D	J01	25	P2107	72 FO1502
HAP23D	J02	49	P2107	69 FO1502
HAP24D	J01	29	P2107	80 FO1502
HAP25D	J0I	47	P2110	06 FO1503
HAP26D	J02	59	P2110	01 FO1503
HAP27D	J01	43	P2110	09 FO1503
HAP28D	J01	39	P2110	15 FO1503
HAP29D	J01	37	P2110	22 FO1503
HAP30D	J02	55	P2110	14 FO1503

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal			Distribution
HAP31D	J01	33	P2110 21 FO1504
HAP32D	J01	35	P2110 27 FO1504
HAP33D	J02	53	P2110 38 FO1504
HAP34D	J01	41	P2110 30 FO1504
HAP35D	J02	57	P2110 33 FO1504
HAP36D	J01	45	P2110 39 FO1504
HAP37D	J02	01	P2110 53 FO1503
HAP38D	J02	71	P2110 46 FO1503
HAP39D	J01	57	P2110 45 FO1503
HAP40D	J01	53	P2110 51 FO1503
HAP41D	J01	49	P2110 66 FO1503
HAP42D	J02	61	P2110 60 FO1503
HAP43D	J01	51	P2110 57 FO1504
HAP44D	J01	55	P2110 63 FO1504
HAP45D	J02	63	P2110 75 FO1504
HAP46D	J01	59	P2110 72 FO1504
HAP47D	J02	65	P2110 69 FO1504
HAP48D	J02	03	P2110 80 FO1504
HAP49D	J02	19	P2113 06 FO1505
HAP50D	J02	73	P2113 01 FO1505
HAP51D	J02	13	P2113 09 FO1505
HAP52D	J02	11	P2113 15 FO1505
HAP53D	J02	07	P2113 22 FO1505
HAP54D	J02	69	P2113 14 FO1505
HAP55D	J02	05	P2113 21 FO1506
HAP56D	J02	09	P2113 27 FO1506
HAP57D	J02	67	P2113 38 FO1506
HAP58D	J02	15	P2113 30 FO1506
HAP59D	J02	17	P2113 33 FO1506
HAP60D	J02	75	P2113 39 FO1506
HAP61D	J02	35	P2113 52 FO1505
HAP62D	J02	83	P2113 46 FO1505
HAP63D	J02	31	P2113 45 FO1505
HAP64D	J02	27	P2113 51 FO1505
HAP65D	J02	25	P2113 66 FO1501
HAP66D	J02	77	P2113 60 FO1505

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal					Distribution
HAP67D	J02	21	P2113	57 FO1506	
HAP68D	J02	23	P2113	63 FO1506	
HAP69D	J02	79	P2113	75 FO1506	
HAP70D	J02	29	P2113	72 FO1506	
HAP71D	J02	33	P2113	69 FO1506	
HAP72D	J02	81	P2113	80 FO1506	
HBBS3A	P1146	78	P3119	05 FO0100	
HBCSTD6	P1145	65	S03	08 FO0200	
HBFABD1	P1146	32	P3106	51 FO1802	
HBFACD1	P1146	16	P3106	40 FO1802	
HBFACOV	P1146	70	P3106	80 FO1802	
HBFADD1	P1146	53	P3106	54 FO1802	
HBFAEO	P1146	74	P3119	26 FO1802	
HBFAGA	P1146	71	P3110	72 FO1802	
HBFAJS	P1146	56	P3108	72 FO1802	
HBFAKS	P1146	57	P3109	72 FO1802	
HBFAXAV	P3106	18	P1145	75 FO1802	
HBFBRD1	P1146	73	P3107	68 FO2200	
HBFVSD1	P1146	77	P3119	06 FO1802	
HBJAPD6	P1145	62	J02	85 FO2300	
HBJAPOV	P1145	58	P3111	75 FO1700	
HBJAQD6	P1145	60	XDS02	01 FO1700	
HBJARD6	P1145	63	J01	85 FO2300	
HBJAROV	P1145	69	P3116	75 FO1700	
HBJASD6	P1145	61	XDS01	01 FO1700	
HBJRCD6	P1145	64	S05	08 FO1700	
HBJ00OV	P1146	09	P3127	29 FO0300	
HBJ01OV	P1146	10	P3127	31 FO0300	
HBJ02OV	P1146	11	P3127	80 FO0300	
HBJ03OV	P1146	13	P3127	43 FO0300	
HBJ04OV	P1146	14	P3126	27 FO0300	
HBJ05OV	P1146	15	P3125	48 FO0300	
HBJ06OV	P1146	17	P3123	45 FO0300	
HBJ07OV	P1146	18	P3123	17 FO0300	
HBJ08OV	P1146	19	P3127	48 FO0300	
HBKADOV	P1146	75	P3119	19 FO1803	

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal				Distribution					
HBKAMD	A01		E068J06	80	FO1803	P1145	07	J06	80 FO1803
HBKAPOV	P1146	76	P3119	31 FO1803					
HBKARD	J04	37	P1145	08 FO1803					
HBKASD	J04	38	P1145	09 FO1803					
HBKATD	J04	39	P1145	10 FO1803					
HBKAUD1	J04	12	P1136	10 FO1803					
HBKB11V1	J07	011	P1136	64 FO0300					
HBKB12V1	J07	012	P1136	61 FO0300					
HBKB13V1	J07	013	P1136	63 FO0300					
HBKB14V1	J07	014	P1136	65 FO0300					
HBLAFO	J07	111	P1145	43 FO1300					
HBLAGA	P1146	69	P3107	72 FO1300					
HBLAKOV	J07	110	P1145	42 FO1300					
HBMY1AV	P1146	20	P3107	76 FO0400					
HBMY2AV	P1146	21	P3108	76 FO0400					
HBMY3AV	P1146	22	P3109	76 FO0400					
HBMY4AV	P1146	23	P3110	76 FO0400					
HBMY5AV	P1146	24	P3111	76 FO0400					
HBMY6AV	P1146	25	P3112	76 FO0400					
HBPPNR	P1146	72	P3106	20 FO1900					
HBST0OV	J07	010	P1145	22 FO1801					
HBST1OV	J07	001	P1145	17 FO1801					
HBST2OV	J07	002	P1145	18 FO1801					
HBST3OV	J07	003	P1145	11 FO1801					
HBST4OV	J07	004	P1145	19 FO1801					
HBST5OV	J07	005	P1145	15 FO1801					
HBST6OV	J07	006	P1145	20 FO1801					
HBST7OV	J07	007	P1145	13 FO1801					
HBST8OV	J07	008	P1145	21 FO1801					
HBST9OV	J07	009	P1145	14 FO1801					
HBT190E	J07	027	P1145	30 FO1401					
HBT191E	J07	028	P1145	31 FO1401					
HBT192E	J07	029	P1145	33 FO1401					
HBT193E	J07	030	P1145	34 FO1401					
HBT200E	J07	031	P1145	35 FO1401					
HBT201E	J07	032	P1145	36 FO1401					

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution
HBT202E	J07 033 P1145 37 FO1401
HBT203E	J07 034 P1145 38 FO1401
HBUPUO	P1146 01 P3106 62 FO2700
HBWAYO	P1146 27 P3119 62 FO1600
HBWAZO	P1146 29 P3119 65 FO1600
HBWBAOV	P1146 80 P3119 55 FO1600
HBWBCA	P1146 08 P3106 17 FO1600
HBWBDA	P1146 59 P3106 13 FO1600
HBWC3S	P1146 67 P3106 07 FO1600
HBYA1OV	J07 021 P1145 23 FO0400
HBYA2OV	J07 022 P1145 24 FO0400
HBYA3OV	J07 023 P1145 25 FO0400
HBYA4OV	J07 024 P1145 26 FO0400
HBYA5OV	J07 025 P1145 27 FO0400
HBYA6OV	J07 026 P1145 29 FO0400
HC+12V7	J04 18 Q02 E FO1900
HC+12V8	Q02 C P01 35 FO2502
HC+15V1	P03 36 P3106 05 FO2504
HC+15V2	P03 37 P3106 76 FO2502
HC+15V3	J01 80 P3106 36 FO1900
HC+5AUX	P01 31 XDS03 02 FO2501
HC+5V26	P01 12 P3106 28 FO2502
HC+5V27	HY01 P03 08 FO2502 J04 25 HY01 FO2502 J04 26 HY01 FO2502
HC+5V28	J04 27 HY 02 FO2502 J04 28 HY02 FO2502 P03 09 HY02 FO2502
HC+5V29	HY03 P03 10 FO2502 J04 60 HY03 FO2502 J04 62 HY03 FO2502
HC+521	J01 61 P001 10 FO2502
HC+522	J01 63 P01 09 FO2502
HC+523	P0 04 P3119 12 FO2502
HC+524	P0 08 P3119 28 FO2502
HC+525	P0 11 P3106 12 FO2502
HC+526	P3106 10 Q01 C FO2502 P3106 11 Q01 C FO2502
HC-15V1	P03 40 Q04 E FO2502 Q04 E P3106 08 FO2502
HC-15V2	J04 64 Q04 C FO2502
HC-5VDC	P0 39 P3119 51 FO2502
HC-5V9	J04 19 P01 38 FO2502
HCCFZ1	P1145 57 XDS04 01 FO2001 P3107 70 XDS04 01 FO2001 P3107 70 XDS04 01 FO2401

Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution								
HCCFZ2	P1145	59	XDS05	01	FO2001	P3107	73	XDS05	01	FO2001
HCCFZ3	P1145	03	XDS06	01	FO2001	P3108	70	XDS06	01	FO2001
HCCFZ4	P1145	04	XDS07	01	FO2001	P3108	73	XDS07	01	FO2001
HCCFZ5	P1145	05	XDS08	01	FO2001	P3109	70	XDS08	01	FO2001
HCCFZ6	P1145	06	XDS09	01	FO2001	P3109	73	XDS09	01	FO2001
HCC01A	J07	184	P3107	77	FO2101	J07	184	P3107	77	FO2403
HCC02A	J07	185	P3107	79	FO2101	J07	185	P3107	79	FO2403
HCC03A	J07	186	P3107	80	FO2101	J07	186	P3107	80	FO2403
HCC04A	J07	187	P3107	66	FO2101	J07	187	P3107	66	FO2403
HCC05A	J07	188	P3107	56	FO2101	J07	188	P3107	56	FO2403
HCC06A	J07	189	P3107	65	FO2101	J07	189	P3107	65	FO2403
HCC07A	J07	190	P3108	77	FO2102	J07	190	P3108	77	FO2403
HCC08A	J07	191	P3108	79	FO2102	J07	191	P3108	79	FO2403
HCC09A	J07	192	P3108	80	FO2102	J07	192	P3108	80	FO2403
HCC10A	J07	193	P3108	66	FO2102	J07	193	P3108	66	FO2403
HCC11A	J07	194	P3108	56	FO2102	J07	194	P3108	56	FO2403
HCC12A	J07	195	P3108	65	FO2102	J07	195	P3108	65	FO2403
HCC13A	J07	196	P3109	77	FO2102	J07	196	P3109	77	FO2403
HCC14A	J07	197	P3109	79	FO2102	J07	197	P3109	79	FO2403
HCC15A	J07	198	P3109	80	FO2102	J07	198	P3109	80	FO2403
HCC16A	J07	199	P3109	66	FO2102	J07	199	P3109	66	FO2403
HCC17A	J07	200	P3110	77	FO2102	J07	200	P3110	77	FO2403

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution								
HCC18A	J07	201	P3109	65	FO2102	J07	201	P3109	65	FO2403
HCC19A	J07	202	P3109	56	FO2102	J07	202	P3109	56	FO2403
HCC20A	J07	203	P3110	79	FO2102	J07	203	P3110	79	FO2403
HCC21A	J07	204	P3110	65	FO2102	J07	204	P3110	65	FO2403
HCC22A	J07	205	P3110	66	FO2102	J07	205	P3110	66	FO2403
HCC23A	J07	206	P3110	56	FO2102	J07	206	P3110	56	FO2403
HCC24A	J07	207	P3110	80	FO2102	J07	207	P3110	80	FO2403
HCC25A	J07	208	P3111	80	FO2102	J07	208	P3111	80	FO2403
HCC26A	J07	209	P3111	79	FO2102	J07	209	P3111	79	FO2403
HCC27A	J07	210	P3111	77	FO2102	J07	210	P3111	77	FO2403
HCC28A	J07	211	P3111	66	FO2102	J07	211	P3111	66	FO2403
HCC29A	J07	212	P3111	56	FO2102	J07	212	P3111	56	FO2403
HCC30A	J07	213	P3111	65	FO2102	J07	213	P3111	65	FO2403
HCC31A	J04	214	P3112	77	FO2103	J07	214	P3112	77	FO2403
HCC32A	J07	215	P3112	79	FO2103	J07	215	P3112	79	FO2403
HCC33A	J07	216	P3112	80	FO2103	J07	216	P3112	80	FO2403
HCC34A	J07	217	P3112	66	FO2103	J07	217	P3112	66	FO2403
HCC35A	J07	218	P3112	56	FO2103	J07	218	P3112	56	FO2403
HCC36A	J07	219	P3112	65	FO2103	J07	219	P3112	65	FO2403
HCC37A	J07	220	P3113	77	FO2103	J07	220	P3113	77	FO2403
HCC38A	J07	221	P3113	79	FO2103	J07	221	P3113	79	FO2403
HCC39A	J07	222	P3113	80	FO2103	J07	222	P3113	80	FO2403
HCC40A	J07	223	P3113	66	FO2103	J07	223	P3113	66	FO2403
HCC41A	J07	224	P3113	56	FO2103	J07	224	P3113	56	FO2403
HCC42A	J07	225	P3113	65	FO2103	J07	225	P3113	65	FO2403
HCC43A	J07	226	P3114	77	FO2103	J07	226	P3114	77	FO2403
HCC44A	J07	227	P3114	79	FO2103	J07	227	P3114	79	FO2403
HCC45A	J07	228	P3114	80	FO2103	J07	228	P3114	80	FO2403
HCC46A	J07	229	P3114	66	FO2103	J07	229	P3114	66	FO2403
HCC47A	J07	230	P3114	56	FO2103	J07	230	P3114	56	FO2403
HCC48A	J07	231	P3114	65	FO2103	J07	231	P3114	65	FO2403
HCC49A	J07	232	P3115	77	FO2103	J07	232	P3115	77	FO2403
HCC50A	J07	233	P3115	79	FO2103	J07	233	P3115	79	FO2403
HCC51A	J07	234	P3115	80	FO2103	J07	234	P31i5	80	FO2403
HCC52A	J07	235	P3115	66	FO2103	J07	235	P3115	66	FO2403
HCC53A	J07	236	P3115	56	FO2103	J07	236	P3115	56	FO2403
HCC54A	J07	237	P3115	65		J07	237	P3115	65	FO2403

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution								
HCC55A	J07	238	P3116	77	FO2104	J07	238	P3116	77	FO2403
HCC56A	J07	239	P3116	79	FO2104	J07	239	P3116	79	FO2403
HCCS7A	J07	240	P3116	80	FO2104	J07	240	P3116	80	FO2403
HCC58A	J07	241	P3116	66	FO2104	J07	241	P3116	66	FO2403
HCC59A	J07	242	P3116	56	FO2104	J07	242	P3116	56	FO2403
HCC60A	J07	243	P3116	65	FO2104	J07	243	P3116	65	FO2403
HCC61A	J07	244	P3117	77	FO2104	J07	244	P3117	77	FO2403
HCC62A	J07	245	P3117	79	FO2104	J07	245	P3117	79	FO2403
HCC63A	J07	246	P3117	80	FO2104	J07	246	P3117	80	FO2403
HCC64A	J07	247	P3117	66	FO2104	J07	247	P3117	66	FO2403
HCC65A	J07	248	P3117	56	FO2104	J07	248	P3117	56	FO2403
HCC66A	J07	249	P3117	65	FO2104	J07	249	P3117	65	FO2403
HCC67A	J07	250	P3118	77	FO2104	J07	250	P3118	77	FO2403
HCC68A	J07	251	P3118	79	FO2104	J07	251	P3118	79	FO2403
HCC69A	J07	252	P3118	80	FO2104	J07	252	P3118	80	FO2403
HCC70A	J07	253	P3118	66	FO2104	J07	253	P3118	66	FO2403
HCC71A	J07	254	P3118	56	FO2104	J07	254	P3118	56	FO2403
HCC72A	J07	255	P3118	65	FO2104	J07	255	P3118	65	FO2403
HCDIDO	P01	14	P1145	77	FO1801	P03	14	P1145	77	FO1801
HCDNRGA	J01	81	P3106	56	FO1900				
HCD00O	P2102	01	P3126	49	FO1101	P2102	01	P3126	49	FO1107
HCD01O	P2102	03	P3126	50	FO1101	P2102	03	P3126	50	FO1107
HCD02O	P2102	04	P3126	51	FO1101	P2102	04	P3126	51	FO1107
HCD03O	P2102	05	P3126	52	FO1101	P2102	05	P3126	52	FO1107
HCD04O	P2102	06	P3126	53	FO1101	P2102	06	P3126	53	FO1107
HCD05O	P2102	07	P3126	54	FO1101	P2102	07	P3126	54	FO1107
HCD06O	P2102	08	P3126	71	FO1101	P2102	08	P3126	71	FO1107
HCD07O	P2102	09	P3126	73	FO1101	P2102	09	P3126	73	FO1107
HCD08O	P2102	10	P3127	46	FO1102	P2102	10	P3127	46	FO1108
HCD09O	P2102	11	P3127	47	FO1102	P2102	11	P3127	47	FO1108
HCD10O	P2102	13	P3127	74	FO1102	P2102	13	P3127	74	FO1108
HCD11O	P2102	14	P3127	75	FO1102	P2102	14	P3127	75	FO1108
HCD12O	P2102	15	P3127	76	FO1102	P2102	15	P3127	76	FO1108
HCD13O	P2102	17	P3127	77	FO1102	P2102	17	P3127	77	FO1108
HCD14O	P2102	18	P3127	78	FO1102	P2102	18	P3127	78	FO1108
HCD15O	P2102	19	P3127	79	FO1102	P2102	19	P3127	79	FO1108

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Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution									
HCD16O	P2102	20	P3127	49	FO1103	P2102	20	P3127	49	FO1108
HCD17O	P2102	21	P3127	50	FO1103	P2102	21	P3127	50	FO1108
HCD18O	P2102	22	P3127	51	FO1103	P2102	22	P3127	51	FO1108
HCD19O	P2102	23	P3127	52	FO1103	P2102	23	P3127	52	FO1108
HCD20O	P2102	24	P3127	53	FO1103	P2102	24	P3127	53	FO1108
HCD21O	P2102	25	P3127	54	FO1103	P2102	25	P3127	54	FO1108
HCD22O	P2102	26	P3127	71	FO1103	P2102	26	P3127	71	FO1108
HCD23O	P2102	27	P3127	73	FO1103	J2102	27	P3127	73	FO1108
HCD24O	P2102	29	P3123	01	FO1104					
HCD25O	P2102	30	P3123	03	FO1104					
HCD26O	P2102	31	P3123	04	FO1104					
HCD27O	P2102	33	P3123	05	FO1104					
HCD28O	P2102	34	P3123	06	FO1104					
HCD29O	P2102	35	P3123	07	FO1104					
HCD30O	P2102	36	P3123	21	FO1104					
HCD31O	P2102	37	P3123	20	FO1104					
HCD32O	P2102	38	P3124	13	FO1105					
HCD33O	P2102	39	P3124	11	FO1105					
HCD34O	P2102	40	P3124	15	FO1105					
HCD35O	P2102	41	P3124	14	FO1105					
HCD36O	P2102	42	P3124	22	FO1105					
HCD37O	P2102	43	P3124	19	FO1105					
HCD38O	P2102	45	P3124	21	FO1105					
HCD39O	P2102	46	P3124	20	FO1105					
HCD40O	P2102	47	P3125	13	FO1106					
HCD41O	P2102	48	P3125	11	FO1106					
HCD42O	P2102	49	P3125	15	FO1106					
HCD43O	P2102	54	P3125	14	FO1106					
HCD44O	P2102	51	P3125	22	FO1106					
HCD45O	P2102	52	P3125	19	FO1106					
HCD46O	P2102	53	P3125	21	FO1106					
HCD47O	P2102	54	P3125	20	FO1106					
HCD48O	P2102	55	P3126	13	FO1107					
HCD49O	P2102	56	P3126	11	FO1107					
HCD50O	P2102	57	P3126	15	FO1107					
HCD51O	P2102	59	P3126	14	FO1107					

*Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued*

Signal	Distribution								
HCD52O	P2102	60	P3126	22 FO1107					
HCD53O	P2102	61	P3126	19 FO1107					
HCD54O	P2102	62	P3126	21 FO1107					
HCD55O	P2102	63	P3126	20 FO1107					
HCD56O	P2102	64	P3127	59 FO1108					
HCD57O	P2102	65	P3127	57 FO1108					
HCDS8O	P2102	66	P3127	56 FO1108					
HCD59O	P2102	68	P3127	55 FO1108					
HCD60O	P2102	69	P3127	65 FO1108					
HCD61O	P2102	70	P3127	66 FO1108					
HCD62O	P2102	71	P3127	68 FO1108					
HCD63O	P2102	72	P3127	69 FO1108					
HCD64O	P2102 73	P3124 49 FO1108	P2102 73	P3124 49	FO1105	P2102	73	P3124 49	FO1106	
	P2102 73	P3124 49 FO1107								
HCD65O	P2102 74	P3124 50 FO1108	P2102 74	P3124 50	FO1105	P2102	74	P3124 50	FO1106	
	P2102 74	P3124 50 FO1107								
HCD66O	P2102 75	P3124 51 FO1108	P2102 75	P3124 51	FO1105	P2102	75	P3124 51	FO1106	
	P2102 75	P3124 51 FO1107								
HCD67O	P2102 76	P3124 52 FO1108	P2102 76	P3124 52	FO1105	P2102	76	P3124 52	FO1106	
	P2102 76	P3124 52 FO1107								
HCD68O	P2102 77	P3124 53 FO1108	P2102 77	P3124 53	FO1105	P2102	77	P3124 53	FO1106	
	P2102 77	P3124 53 FO1107								
HCD69O	P2102 78	P3124 54 FO1108	P2102 78	P3124 54	FO1105	P2102	78	P3124 54	FO1106	
	P2102 78	P3124 54 FO1107								
HCD70O	P2102 79	P3124 71 FO1108	P2102 79	P3124 71	FO1105	P2102	79	P3124 71	FO1106	
	P2102 79	P3124 71 FO1107								
HCD71O	P2102 80	P3124 73 FO1108	P2102 80	P3124 73	FO1105	P2102	80	P3124 73	FO1106	
	P2102 80	P3124 73 FO1107								
HCE01A	P1146 30	P3107 69 FO2001								
HCE02A	P1146 31	P3107 74 FO2001								
HCE03A	P1146 33	P3108 69 FO2001								
HCE04A	P1146 34	P3108 74 FO2001								
HCE0SA	P1146 35	P3109 69 FO2001								
HCE06A	P1146 36	P3109 74 FO2001								
HCE07A	P1146 37	P3110 69 FO2001								
HCE08A	P1146 38	P3110 74 FO2001								

Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal	Distribution							
HCE09A	P1146	39	P3111	69	FO2002			
HCE10A	P1146	40	P3111	74	FO2002			
HCE11A	P1146	41	P3112	69	FO2002			
HCE12A	P1146	42	P3112	74	FO2002			
HCE13A	P1146	43	P3113	69	FO2002			
HCE14A	P1146	45	P3113	74	FO2002			
HCE15A	P1146	46	P3114	69	FO2002			
HCE16A	P1146	47	P3114	74	FO2002			
HCE17A	P1146	48	P3115	69	FO2002			
HCE18A	P1146	49	P3115	74	FO2002			
HCFIZ1	P1145	45	XDS1001	FO2001	P3110	70	XDS10 01	FO2001
HCFIZ2	P1145	46	XDS1101	FO2001	P3110	73	XDS11 01	FO2001
HCFIZ3	P1145	47	XDS1201	FO2002	P3111	70	XDS12 01	FO2002
HCFIZ4	P1145	48	XDS1301	FO2002	P3111	73	XDS13 01	FO2002
HCFIZ5	P1145	49	XDS1401	FO2002	P3112	70	XDS14 01	FO2002
HCFIZ6	P1145	50	XDS1501	FO2002	P3112	73	XDS15 01	FO2002
HCFOZ1	P1145	51	XDS1601	FO2002	P3113	70	XDS16 01	FO2002
HCFOZ2	P1145	52	XDS1701	FO2002	P3113	73	XDS17 01	FO2002
HCFOZ3	P1145	53	XDS1801	FO2002	P3114	70	XDS18 01	FO2002
HCFOZ4	P1145	54	XDS1901	FO2002	P3114	73	XDS19 01	FO2002
HCFOZ5	P1145	55	XDS2001	FO2002	P3115	70	XDS20 01	FO2002
HCFOZ6	P1145	56	XDS2101	FO2002	P3115	73	XDS21 01	FO2002
HCFP5O	P3106	33	J06	12	FO1900			
HCF01A	J07	112	P3107	27	FO2101	J07	112 P3107 27	FO2102
	J07	112	P3107	27	FO2403			
HCF02A	J07	113	P3107	60	FO2102	J07	113 P3107 60	FO2102
	J07	113	P3107	60	FO2103	J07	113 P3107 60	FO2403
HCF03A	J07	114	P3107	34	FO2102	J07	114 P3107 34	FO2103
	J07	114	P3107	34	FO2403			
HCF04A	J07	115	P3107	38	FO2103	J07	115 P3107 38	FO2103
	J07	115	P3107	38	FO2104	J07	115 P3107 38	FO2403
HCF05A	J07	116	P3107	29	FO2103	J07	116 P3107 29	FO2104
	J07	116	P3107	29	FO2104	J07	116 P3107 29	FO2403
HCF06A	J07	117	P3107	36	FO2104	J07	117 P3107 36	FO2104
	J07	117	P3107	36	FO2403			
HCF07A	J07	118	P3108	27	FO2102	J07	118 P3108 27	FO2403
HCF08A	J07	119	P3108	60	FO2102	J07	119 P3108 60	FO2403

*Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued*

Signal	Distribution									
HCF09A	J07	120	P3108	34	FO2102	J07	120	P3108	34	FO2403
HCF10A	J07	121	P3108	38	FO2102	J07	121	P3108	38	FO2403
HCF10A1	P1146	54	P3108	09	FO2102					
HCF11A	J07	122	P3108	29	FO2101	J07	122	P3108	29	FO2102
	J07	122	P3108	29	FO2403					
HCF12A	J07	123	P3108	36	FO2102	J07	123	P3108	36	FO2102
	J07	123	P3108	36	FO2103	J07	123	P3108	36	FO2403
HCF13A	J07	124	P3109	27	FO2102	J07	124	P3109	27	FO2103
	J07	124	P3109	27	FO2103	J07	124	P3109	27	FO2403
HCF14A	J07	125	P3109	60	FO2103	J07	125	P3109	60	FO2103
	J07	125	P3109	60	FO2104	J07	125	P3109	60	FO2403
HCF15A	J07	126	P3109	34	FO2103	J07	126	P3109	34	FO2104
	J07	126	P3109	34	FO2104	J07	126	P3109	34	FO2403
HCF16A	J07	127	P3109	38	FO2104	J07	127	P3109	38	FO2104
	J07	127	P3109	38	FO2403					
HCF17A	J07	128	P3110	27	FO2102	J07	128	P3110	27	FO2403
HCF18A	J07	129	P3109	36	FO2102	J07	129	P3109	36	FO2403
HCF19A	J07	130	P3109	29	FO2102	J07	130	P3109	29	FO2403
HCF20A	J07	131	P3110	60	FO2102	J07	131	P3110	60	FO2403
HCF21A	J07	132	P3110	36	FO2102	J07	132	P3110	36	FO2403
HCF22A	J07	133	P3110	38	FO2102	J07	133	P3110	38	FO2403
HCF22A1	P1146	55	P3110	09	FO2102					
HCF23A	J07	134	P3110	29	FO2102	J07	134	P3110	29	FO2403
HCF24A	J07	135	P3110	34	FO2102	J07	135	P3110	34	FO2403
HCF25A	J07	136	P3111	34	FO2102	J07	136	P3111	34	FO2403
HCF26A	J07	137	P3111	60	FO2102	J07	137	P3111	60	FO2403
HCF27A	J07	138	P3111	27	FO2102	J07	138	P3111	27	FO2403
HCF28A	J07	139	P3111	38	FO2102	J07	139	P3111	38	FO2403
HCF29A	J07	140	P3111	29	FO2102	J07	140	P3111	29	FO2403
HCF30A	J07	141	P3111	36	FO2102	J07	141	P3111	36	FO2403
HCF31A	J07	142	P3112	27	FO2103	J07	142	P3112	27	FO2403
HCF32A	J07	143	P3112	60	FO2103	J07	143	P3112	60	FO2403
HCF33A	J07	144	P3112	34	FO2103	J07	144	P3112	34	FO2403
HCF34A	J07	145	P3112	38	FO2103	J07	145	P3112	38	FO2403
HCF35A	J07	146	P3112	29	FO2103	J07	146	P3112	29	FO2403
HCF36A	J07	147	P3112	36	FO2103	J07	147	P3112	36	FO2403

Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued

Signal						Distribution			
HCF37A	J07	148	P3113	27	FO2103	J07	148	P3113	27	FO2403
HCF38A	J07	149	P3113	60	FO2103	J07	149	P3113	60	FO2403
HCF39A	J07	150	P3113	34	FO2103	J07	150	P3113	34	FO2403
HCF40A	J07	151	P3113	38	FO2103	J07	151	P3113	38	FO2403
HCF41A	J07	152	P3113	29	FO2103	J07	152	P3113	29	FO2403
HCF42A	J07	153	P3113	36	FO2103	J07	153	P3113	36	FO2403
HCF43A	J07	154	P3114	27	FO2103	J07	154	P3114	27	FO2403
HCF44A	J07	155	P3114	60	FO2103	J07	155	P3114	60	FO2403
HCF45A	J07	156	P3114	34	FO2103	J07	156	P3114	34	FO2403
HCF46A	J07	157	P3114	38	FO2103	J07	157	P3114	38	FO2403
HCF47A	J07	158	P3114	29	FO2103	J07	158	P3114	29	FO2403
HCF48A	J07	159	P3114	36	FO2103	J07	159	P3114	36	FO2403
HCF49A	J07	160	P3115	27	FO2103	J07	160	P3115	27	FO2403
HCF50A	J07	161	P3115	60	FO2103	J07	161	P3115	60	FO2403
HCF51A	J07	162	P3115	34	FO2103	J07	162	P3115	34	FO2403
HCF52A	J07	163	P3115	38	FO2103	J07	163	P3115	38	FO2403
HCF53A	J07	164	P3115	29	FO2103	J07	164	P3115	29	FO2403
HCF54A	J07	165	P3115	36	FO2103	J07	165	P3115	36	FO2403
HCF55A	J07	166	P3116	27	FO2104	J07	166	P3116	27	FO2403
HCF56A	J07	167	P3116	60	FO2104	J07	167	P3116	60	FO2403
HCF57A	J07	168	P3116	34	FO2104	J07	168	P3116	34	FO2403
HCF58A	J07	169	P3116	38	FO2104	J07	169	P3116	38	FO2403
HCF59A	J07	170	P3116	29	FO2104	J07	170	P3116	29	FO2403
HCF60A	J07	171	P3116	36	FO2104	J07	171	P3116	36	FO2403
HCF61A	J07	172	P3117	27	FO2104	J07	172	P3117	27	FO2403
HCF62A	J07	173	P3117	60	FO2104	J07	173	P3117	60	FO2403
HCF63A	J07	174	P3117	34	FO2104	J07	174	P3117	34	FO2403
HCF64A	J07	175	P3117	38	FO2104	J07	175	P3117	38	FO2403
HCF65A	J07	176	P3117	29	FO2104	J07	176	P3117	29	FO2403
HCF66A	J07	177	P3117	36	FO2104	J07	177	P3117	36	FO2403
HCF67A	J07	178	P3118	27	FO2104	J07	178	P3118	27	FO2403
HCF68A	J07	179	P3118	60	FO2104	J07	179	P3118	60	FO2403
HCF69A	J07	180	P3118	34	FO2104	J07	180	P3118	34	FO2403
HCF70A	J07	181	P3118	38	FO2104	J07	181	P3118	38	FO2403
HCF71A	J07	182	P3118	29	FO2104	J07	182	P3118	29	FO2403
HCF72A	J07	183	P3118	36	FO2104	J07	183	P3118	36	FO2403

Table 7-10. MTS Interconnecting Key Signal Lookup -Continued

Signal	Distribution														
HCGNPU	P3106	63	Q04	B	FO1900	P3106	63	Q04	B	FO2502					
HCG73	J01	72	P3106	32											
HCG74	J01	70	P3107	16											
HCG76	J01	66	P3106	67											
HCG78	J01	64	P01	27	FO2502										
HCG79	J01	62	P01	26	FO2502										
HCG80	J01	68	P3106	58	FO2502										
HCG81	P01	21	P3119	16	FO2502										
HCG82	P01	25	P3119	32	FO2502										
HCG83	P01	28	P3106	02	FO2502										
HCG84	P01	37	P3119	57	FO2502										
HCG85	P03	38	P3106	01	FO2502										
HCG86	P03	39	P3106	57	FO2502										
HCG87	P01	29	P3106	44	FO2502										
HCG88	P03	41	P3107	02	FO2502										
HCG89	J04	01	P01	36	FO2502										
HCG90	J04	04	P03	25	FO2502										
HCG91	J04	05	P03	26	FO2502										
HCG92	J04	02	P03	27	FO2502										
HCG93	P03	33	S06	06	FO2501	P03	33	S06	06	FO2401					
HCG94	P01	33	S06	05	FO2401	P01	33	S06	05	FO2501					
HCG95	J04	03	P3127	02	FO2700										
HCG96	P3127	16	P01	34	FO2502										
HCG97	P2106	67	J04	73	FO2700										
HCJAPD6	P1145	67	P3111	71	FO2300										
HCJARD6	P1145	76	P3116	71	FO2300										
HCJMPR2	J04	44	J04	45	FO2700	J04	45	J04	49	FO2700	J04	49	J04	50	FO2700
	J04	50	J04	51	FO2700										
HCNEUT	J03	C	P02	10	FO2501	P04	10	J03	C	FO2501					
HCNRGA	J01	79	P3106	52	FO1900										
HCPRB+51	P1146	06	Q03	E	FO1900	P1146	06	Q03	E	FO2502	J01	69	Q03	E	FO1900
	J01	71	Q03	E	FO2502										
HCPSFT	P03	32	XDS03	01	FO2501	XDS03	01	P01	32	FO2501	P1145	80	XDS0301		
HCPS1ON	P01	15	S06	03	FO2501										
HCPS2ON	P03	15	S06	04	FO2501										
HCPUFA	P1146	79	P3118	71	FO1900										

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*Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued*

Signal	Distribution												
HCP5LO	P1146	68	P3119	75	FO1900								
HCP5MO	P1146	66	P3119	69	FO1900								
HCQ1BASE	P3106	22	Q01	B	FO1900	P3106	22	Q01	B	FO2502			
HCQ1MTR	P3106	35	Q01	E	FO2502	Q03	C	Q01	E	FO2502	Q03	CQ01 E	FO1900
	Q03	C	Q03	B	FO1900								
HCSC+12V	J06	56	P3119	48	FO1900								
HCSC+5V	J06	74	P3119	43	FO1900								
HCSC-5V	J06	64	P3119	78	FO1900								
HCSNS1	J04	41	P3119	09	FO2700	J04	41	P3119	09	FO2700	J04	41 P3119 09	FO1900
HCSNS2	J04	42	P3119	21	FO2700	J04	42	P3119	21	FO2700	J04	42 P3119 21	FO1900
HCSNS3	J04	43	P3119	37	FO2700	J04	43	P3119	37	FO2700	J04	43 P3119 37	FO1900
HCSNS4	J04	36	P3119	63	FO2700	J04	36	P3119	63	FO2700	J04	36 P3119 63	FO1900
HCSNS5	J04	40	P3119	56	FO2700	J04	40	P3119	56	FO2700	J04	40 P3119 56	FO1900
HCS12V	P3106	47	Q02	B	FO2502	P3106	47	Q02	B	FO1900			
HCTP21O	J01	76	P3119	53	FO2600	J01	76	P3119	53	FO1900			
HCT15R1	J01	82	P3106	75	FO1900								
HC01AO	J01	73	P1145	71	FO2600								
HC01BO	J01	74	P1145	78	FO2600								
HC1O5P	P1146	50	P3119	07	FO1900								
HC135A	J03	B	P02	08	FO2501	P04	08	J03	B	FO2501			
HC135AJ	P04		J03		FO2501								
HC135B	P04	07	J03	E	FO2501	J03	E	P02	07	FO2501			
HC135BJ	J03		P02		FO2501								
HC20AO1	J01	75	P1136	47	FO2600								
HC20SP	P1146	51	P3119	33	FO1900								
HC21BO	P1146	05	P3119	47	FO1900								
HC21CO	P1146	04	P3119	41	FO1900								
HC40AO	J01	77	P1145	73	FO2600								
HC40BO	J01	78	P1145	74	FO2600								
HC51LO	P1146	63	P3119	10	FO1900								
HCS1MO	P1146	60	P3119	24	FO1900								
HC52LO	P1146	64	P3119	23	FO1900								
HC52MO	P1146	61	P3119	20	FO1900								
HC53LO	P1146	65	P3119	39	FO1900								
HC53MO	P1146	62	P3119	29	FO1900								
HC6020	J01	67	P3106	59	FO1900								

*Table 7-10. MTS Interconnecting Key Signal Lookup
-Continued*

Signal	Distribution												
WBCCRA1	P1136	25	*S04	03	FO2401								
WBCCSA1	P1136	23	*S04	01	FO2401								
WBCLTA6	S04	08	*S04	04	FO2401	S04	08	P1145	68	FO2401			
WBDDIO1	*J04	14	P1136	17	FO2700								
WBDLTA6	S01	08	*S01	04	FO2401	S01	08	P1145	66	FO2401			
WBDRRA1	P1136	20	*S01	03	FO2401								
WBDRSA1	P1136	19	*S01	01	FO2401								
WBLTEA1	P1136	38	S02	03	FO2501	*S02	03	P03	30	FO2501	P03	30	P01	30	FO2501
WBLTLA	S02	04	*S02	08	FO2401								
WBRCRA1	P1136	26	*S05	03	FO2401								
WBRCSA1	P1136	24	*S05	01	FO2401								
WBSTRA1	P1136	30	*S03	03	FO2401								
WBSTSA1	P1136	29	*S03	01	FO2401								
WBTCSA1	P1136	06	*J06	02	FO2402								
WBU56A1	J04*	52	P1136	08	FO1803								
WBU57A1	J04*	53	P1136	09	FO1803								
WB10704	J04*	32	P1145	01	FO2700								
WLOVRA	P01	16	P1145	72	FO2501	PO1	16	P1145	72	FO2700			
WSTDTA	*TB11	54	A01	E144	FO2402	A01		E144	P1145	79	FO2402		
WSWGND	P1145	70	S05	05	FO2700	S05	05	S04	05	FO2401	S04	05	S03	05	FO2401
	S03	05	S02	05	FO2401	S02	05	S01	05	FO2401	S01	05	S01	06	FO2401
	S01	06	S02	06	FO2401	S02	06	S04	06	FO2401			
WTSBCA1	J07	109	P1145	41	FO0901								
WTSSCA1	J07	108	P1145	40	FO0901								
WTSSSA1	J07	107	P1145	39	FO0901								

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Table 7-11. Test Probe Assembly Key Signal Lookup

Signal				Distribution
HAP01D	P01	15	FO2601	
HAP01DT	P03	07A	FO2601	
HAP02D	P01	13	FO2601	
HAP02DT	P03	06A	FO2601	
HAP03D	P01	09	FO2601	
HAP03DT	P03	05A	FO2601	
HAP04D	P01	07	FO2601	
HAP04DT	P03	04A	FO2601	
HAP05D	P01	05	FO2601	
HAP05DT	P03	03B	FO2601	
HAP06D	P02	37	FO2601	
HAP06DT	P03	02B	FO2601	
HAP07D	P01	01	FO2601	
HAP07DT	P03	02A	FO2601	
HAP08D	P01	03	FO2601	
HAP08DT	P03	03A	FO2601	
HAP09D	P02	39	FO2601	
HAP09DT	P03	04B	FO2601	
HAP10D	P01	22	FO2601	
HAP10DT	P03	05B	FO2601	
HAP11D	P02	41	FO2601	
HAP11DT	P03	06B	FO2601	
HAP12D	P02	43	FO2601	
HAP12DT	P03	07B	FO2601	
HAP13D	P01	31	FO2602	
HAP13DT	P03	14A	FO2602	
HAP14D	P02	51	FO2602	
HAP14DT	P03	13A	FO2602	
HAP15D	P01	27	FO2602	
HAP15DT	P03	12A	FO2602	
HAP16D	P01	23	FO2602	
HAP16DT	P03	11A	FO2602	
HAP17D	P01	21	FO2602	
HAP17DT	P03	10A	FO2602	
HAPT18D	P02	47	FO2602	
HAP18DT	P03	09A	FO2602	
HAP19D	P01	17	FO2602	

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Table 7-11. Test Probe Assembly Key Signal Lookup
-Continued

Signal				Distribution			
HAP19DT	P03	08B	FO2602				
HAP20D	P01	19	FO2602				
HAP20DT	P03	09B	FO2602				
HAP21D	P02	45	FO2602				
HAP21DT	P03	10B	FO2602				
HAP22D	P01	25	FO2602				
HAP22DT	P03	11B	FO2602				
HAP23D	P02	49	FO2602				
HAP23DT	P03	12B	FO2602				
HAP24D	P01	29	FO2602				
HAP24DT	P03	13B	FO2602				
HAP25D	P01	47	FO2602				
HAP25DT	P03	20A	FO2602				
HAP26D	P02	59	FO2602				
HAP26DT	P03	19A	FO2602				
HAP27D	P01	43	FO2602				
HAP27DT	P03	18A	FO2602				
HAP28D	P01	39	FO2602				
HAP28DT	P03	17A	FO2602				
HAP29D	P01	37	FO2602				
HAP29DT	P03	16A	FO2602				
HAP30D	P02	55	FO2602				
HAP30DT	P03	15A	FO2602				
HAP31D	P01	33	FO2602				
HAP31DT	P03	14B	FO2602				
HAP32D	P01	35	FO2602				
HAP32DT	P03	15B	FO2602				
HAP33D	P02	53	FO2602				
HAP33DT	P03	16B	FO2602				
HAP34D	P01	41	FO2602				
HAP34DT	P03	17B	FO2602	P03	17B	FO2602	
HAP35D	P02	57	FO2602				
HAP35DT	P03	18B	FO2602				
HAP36D	P01	45	FO2602				
HAP36DT	P03	19B	FO2602				
HAP37D	P02	01	FO2602				

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*Table 7-11. Test Probe Assembly Key Signal Lookup
-Continued*

Signal				Distribution			
HAP37DT	P03	26A	FO2602				
HAP38D	P02	71	FO2602				
HAP38DT	P03	25A	FO2602				
HAP39D	P01	57	FO2602				
HAP39DT	P03	24A	FO2602				
HAP40D	P01	53	FO2602				
HAP40DT	P03	23A	FO2602				
HAP41D	P01	49	FO2602				
HAP41DT	P03	22A	FO2602				
HAP42D	P02	61	FO2602				
HAP42DT	P03	21A	FO2602				
HAP43D	P01	51	FO2602				
HAP43DT	P03	22B	FO2602				
HAP44D	P01	55	FO2602				
HAP44DT	P03	23B	FO2602				
HAP45D	P02	63	FO2602				
HAP45DT	P03	24B	FO2602				
HAP46D	P01	59	FO2602				
HAP46DT	P03	25B	FO2602	P03	25B	FO2602	
HAP47D	P02	65	FO2602				
HAP47DT	P03	26B	FO2602				
HAP48D	P02	03	FO2602				
HAP48DT	P03	27B	FO2602				
HAP49D	P02	19	FO2602				
HAP49DT	P03	33A	FO2602				
HAP50D	P02	73	FO2602				
HAP50DT	P03	32A	FO2602	P03	32A	FO2602	
HAP51D	P02	13	FO2602				
HAP51DT	P03	31A	FO2602				
HAP52D	P02	11	FO2602				
HAP52DT	P03	30A	FO2602				
HAP53D	P02	07	FO2602				
HAP53DT	P03	29A	FO2602				
HAP54D	P02	69	FO2602				
HAP54DT	P03	28A	FO2602				
HAP55D	P02	05	FO2602				

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*Table 7-11. Test Probe Assembly Key Signal Lookup
-Continued*

Signal	Distribution		
HAP55DT	P03	28B	FO2602
HAP56D	P02	09	FO2602
HAP56DT	P03	29B	FO2602
HAP57D	P02	67	FO2602
HAP57DT	P03	30B	FO2602
HAP58D	P02	15	FO2602
HAP58DT	P03	31B	FO2602
HAP59D	P02	17	FO2602
HAP59DT	P03	32B	FO2602
HAP60D	P02	75	FO2602
HAP60DT	P03	33B	FO2602
HAPA61D	P02	35	FO2602
HAP61DT	P03	39B	FO2602
HAP62D	P02	83	FO2602
HAP62DT	P03	38B	FO2602
HAP63D	P02	31	FO2602
HAP63DT	P03	37B	FO2602
HAP64D	P02	27	FO2602
HAP64DT	P03	36B	FO2602
HAP65D	P02	25	FO2602
HAP65DT	P03	36A	FO2602
HAP66D	P02	77	FO2602
HAP66DT	P03	34A	FO2602
HAP67D	P02	21	FO2602
HAP67DT	P03	34B	FO2602
HAP68D	P02	23	FO2602
HAP68DT	P03	35B	FO2602
HAP69D	P02	79	FO2602
HAP69DT	P03	35A	FO2602
HAP70D	P02	29	FO2602
HAP70DT	P03	37A	FO2602
HAP71D	P02	33	FO2602
HAP71DT	P03	38A	FO2602
HAP72D	P02	81	FO2602
HAP72DT	P03	39A	FO2602
HBJAPD6	XDS2	01	FO2601

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Table 7-11. Test Probe Assembly Key Signal Lookup
-Continued

Signal				Distribution
HBJARD6	XDS1	01	FO2601	
HC+15R1	P01	82	FO2601	
HC+15V3	P01	80	FO2601	
HC+521	P01	61	FO2601	
HC+522	P01	63	FO2601	
HCDNRGA	L1	+2	FO2601	
HCDNRGA1	P01	79	FO2601	
HCG01	P01	16	FO2601	
HCG02	P01	14	FO2601	
HCG03	P01	10	FO2601	
HCG04	P01	08	FO2601	
HCG05	P01	06	FO2601	
HCG06	P02	38	FO2601	
HCG07	P01	02	FO2601	
HCG08	P01	04	FO2601	
HCG09	P02	40	FO2601	
HCG10	P01	12	FO2601	
HCG11	P02	42	FO2601	
HCG12	P02	44	FO2601	
HCG13	P01	32	FO2602	
HCG14	P02	52	FO2602	
HCG15	P01	28	FO2602	
HCG16	P01	24	FO2602	
HCG17	P01	22	FO2602	
HCG18	P02	48	FO2602	
HCG19	P01	18	FO2602	
HCG20	P01	20	FO2602	
HCG21	P02	46	FO2602	
HCG22	P01	26	FO2602	
HCG23	P02	50	FO2602	
HCG24	P01	30	FO2602	
HCG25	P01	48	FO2602	
HCG26	P02	60	FO2602	
HCG27	P01	44	FO2602	
HCG28	P01	40	FO2602	
HCG29	P01	38	FO2602	

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Table 7-11. Test Probe Assembly Key Signal Lookup
-Continued

Signal				Distribution
HCG30	P02	56	FO2602	
HCG31	P01	34	FO2602	
HCG32	P01	36	FO2602	
HCG33	P02	54	FO2602	
HCG34	P01	42	FO2602	
HCG35	P02	58	FO2602	
HCG36	P01	46	FO2602	
HCG37	P02	02	FO2602	
HCG38	P02	72	FO2602	
HCG39	P01	58	FO2602	
HCG40	P01	54	FO2602	
HCG41	P01	50	FO2602	
HCG42	P02	62	FO2602	
HCG43	P01	52	FO2602	
HCG44	P01	56	FO2602	
HCG45	P02	64	FO2602	
HCG46	P01	60	FO2602	
HCG47	P02	66	FO2602	
HCG48	P02	04	FO2602	
HCG49	P02	20	FO2602	
HCG50	P02	74	FO2602	
HCG51	P02	14	FO2602	
HCG52	P02	12	FO2602	
HCG53	P02	08	FO2602	
HCG54	P02	70	FO2602	
HCG55	P02	06	FO2602	
HCG56	P02	10	FO2602	
HCG57	P02	68	FO2602	
HCG58	P02	16	FO2602	
HCG59	P02	18	FO2602	
HCG60	P02	76	FO2602	
HCG61	P02	36	FO2602	
HCG62	P02	84	FO2602	
HCG63	P02	32	FO2602	
HCG64	P02	28	FO2062	
HCG65	P02	26	FO2602	

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Table 7-11. Test Probe Assembly Key Signal Lookup
-Continued

Signal				Distribution			
HCG66	P02	78	FO2602				
HCG67	P02	22	FO2602				
HCG68	P02	24	FO2602				
HCG69	P02	80	FO2602				
HCG70	P02	30	FO2602				
HCG71	P02	34	FO2602				
HCG72	P02	82	FO2602				
HCG73	P01	72	FO2601				
HCG73T	P03	27A	FO2601	P03	27A	FO2601	
HCG74	P01	70	FO2601				
HCG76	P01	66	FO2601				
HCG78	P01	64	FO2601				
HCG79	P01	62	FO2601				
HCG80	P01	68	FO2601				
HCG81	P01	83	FO2601				
HCNRGA	L1	+1	FO2601				
HCNRGA1	P01	81	FO2601				
HCNUTLA	L1	-CT	FO2601				
HCPRB+51	P01	69	FO2601				
HCPRB+52	P01	71	FO2601				
HCPRB+53	P03	08A	FO2601	P03	08A	FO2601	
HCTP210	P01	76	FO2601				
HC01A0	P01	73	FO2601				
HC01A0T	P03	01A	FO2601	P03	01A	FO2601	
HC01B0	P01	74	FO2601				
HC01B0T	P03	01B	FO2601	P03	01B	FO2601	
HC20A01	P01	75	FO2601				
HC40A0	P01	77	FO2601				
HC40A0T	P03	40A	FO2601	P03	40A	FO2601	
HC40B0	P01	78	FO2601				
HC40B0T	P03	40B	FO2601	P03	40B	FO2601	
HC6020	P01	67	FO2601				

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SECTION II. OVERALL THEORY OF OPERATION

7-6. Overall Functional Description (fig. 7-7). The MTS performs circuit card identification, continuity, and functional tests by a comparison of the data stored in internal memory circuits to the outputs of the card under test (CUT). If the CUT data matches the memory data, a passed card (GO condition) is indicated. If a mismatch in data occurs, a failed card test (NO-GO condition) is indicated.

a. The MTS Follows a set sequence of operations during a card test. The test sequence is initiated by placing the probe assembly on the card to be tested. A set of six card identification (card ID) signals are applied by the probe function to the timing and control function where they are converted to a 7-digit binary code. This binary code identifies the CUT to the MTS and initiates the sequence timing. The test sequence is a combination both of manual and automatic operations.

b. Continuity testing of circuit cards checks for broken wires or pins in CUT signal paths. During this test, the unit under test (UUT) power is on and all signal lines on the CUT should be either a logic one or a zero. On the CUT, all input pins are connected either to a logic output or a pull-up resistor; all logic outputs automation assumes a logic one or zero state. Through the umbilical the MTS applies a 1.5-vdc bias to all signal lines. Any line showing more than 0.2 vdc and less than 2 vdc is identified by the error detect logic, denoting a continuity failure. Some card in the system have unused pins, with no connections on the card or inside an IC. Normally, these pins would fail any continuity test. However, the generated card ID signal is applied to the mask function, causing it to generate an input/output (I/O) pin mask. The mask forces a continuity test pass on this type of pin. Continuity test errors are displayed on the MTS front panel as a function of their associated chip. Each CONTINUITY ERROR lamp identifies a group of lines in which the malfunction occurred. Each lamp represents 12 lines for six chip cards, or 14 lines for five-chip cards. Further isolation requires probing of the M and D connector on the MTS front panel.

NOTE
To prevent spurious signal generation on the system bus, continuity tests are not performed on the ac I/O cards (587107). No continuity tests are performed on

digital (modem) cards, because these cards are tested out of the system.

c. The MTS functional card test consists of a truth table verification of the CUT. A table for each type of IC is stored in the control memory function. The functional test is performed on one IC at a time. The timing and control function enables the mask and control memory functions, which control test length and any clocking function. The mask data output disables all probe function output gates except those related to the specific IC under test identified by a function of the card ID from timing and control. The control memory test data (test pattern) is applied by the probe function to the CUT. Return data from the CUT is passed by the probe function and applied to the error detect function. There, it is compared to the truth table stored in data memory (compare data), and the front panel indicators display the test results. For functional cards tested by the MTS where adapter cards are required, the MTS detects card failures but does not isolate to the faulty IC. The front panel indicators indicate a signal path that is faulty on the functional cards and on the 587107 and 587124 cards.

d. When continuity and functional tests are completed, the timing and control function returns the MTS to its original idle condition. Also, the front panel GO/NO-GO lamps are lighted, depending on the test results. To repeat a test sequence the probe assembly must be removed and replaced on the CUT, or the REPEAT CYCLE switch must be activated. If continuous testing is required, the CONTINUOUS CYCLE switch is actuated.

e. Self-test is initiated with the probe assembly placed on the self-test strip located behind the access door on the front panel. The self -test function generates dummy card ID signals corresponding to the Card ID signals of the MTS testable system cards. One at a time, the dummy binary coded card IDs are applied to the data memory and mask functions. The MTS performs the card test sequence for that card, and the self test function supplies the test results. Each card ID test sequence is performed until all possible function testing information is checked. If an error occurs, the MTS continues testing the function on the dummy card ID where a function error is detected. The SELF-TEST switch on the front panel must be pressed to continue the self-test. If no error is detected, the MTS is in proper working condition.
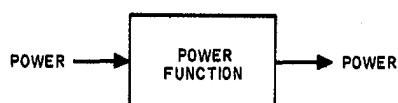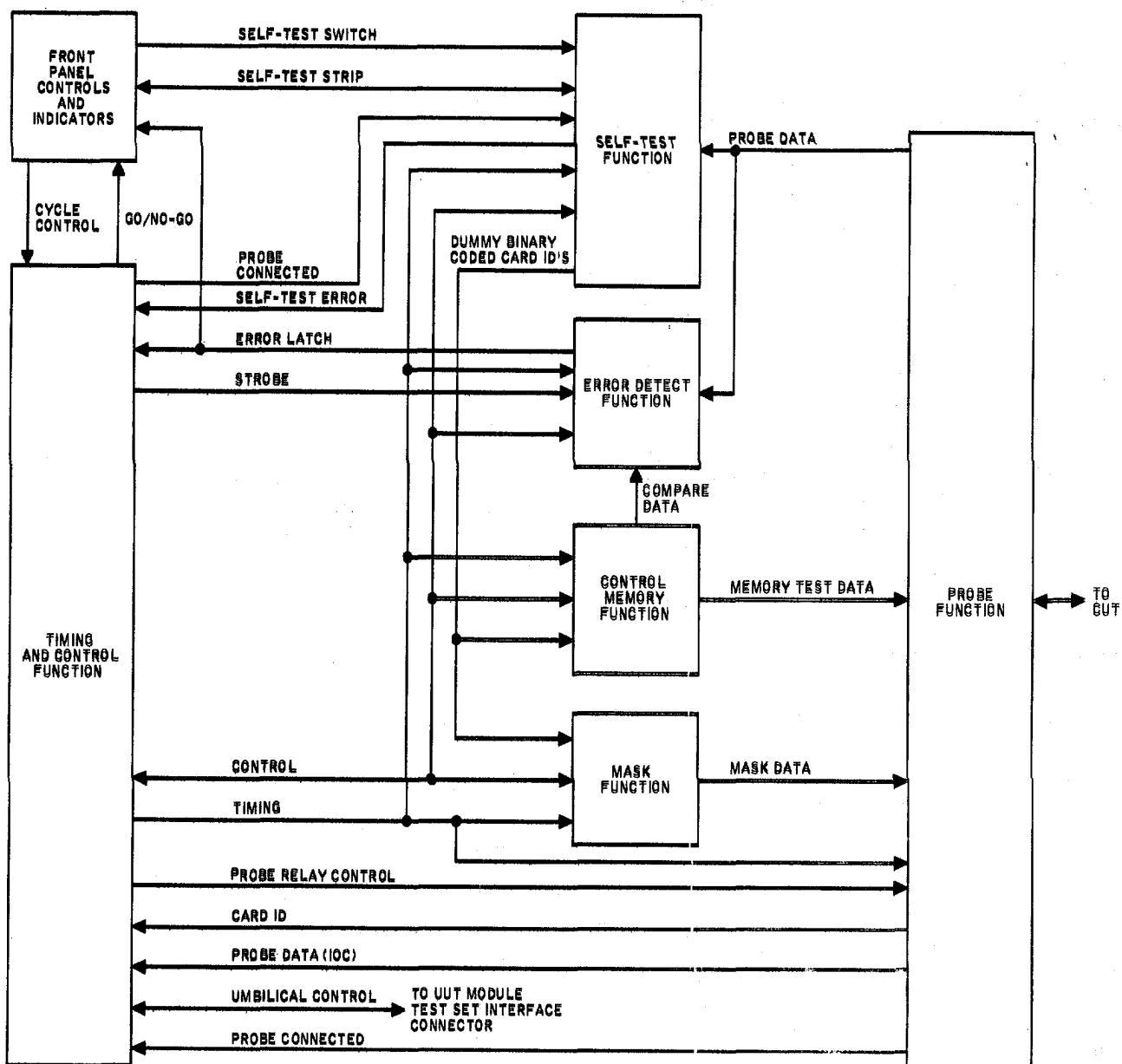
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Figure 7-7. Module Test Set Block Diagram

SECTION III. DETAILED DESCRIPTION

7-7. General (fig. 7-8). The MTS tests digital circuit cards under dynamic conditions. The testing of a CUT is initiated by the connection of the test probe assembly to the CUT, which is in a system (unit under test), or to connector J6 on the front of the MTS for individual card test. Self-test is initiated by the connection of the test probe assembly to self-test strip TB101 on the front of the MTS. This causes the MTS to advance to the next state in the testing sequence. Events that occur in this state cause the MTS to advance to the next state. This sequence continues until the test is completed. The MTS includes the test sequence control function that provides timing, and the probe assembly that relays the CUT ID to the test data generation function. This function provides the test data and masks to the test data control. The I/O mask determines which lines are output lines and which are input lines for each type of CUT. The test data control provides the test data to the CUT through the probe assembly. The CUT response is sent to the test data compare/error detect function through the probe assembly. The error outputs from the-test data compare drive the indicators on the front panel. During self-test, the test data control sends test data to the self-test function for error detection.

a. *Test Sequence Control.* The test sequence control function is made up of the following subfunctions:

(1) State logic (para 7-8)
(2) Special card test logic (para 7-9)
(3) Reset logic (para 7-10)
(4) Clock and timing (para 7-11)

b. *Test Probe Assembly.* The test probe assembly consists of the probe handle, the sacrificial connector, connector P1, and connector P2 (para 7-12).

c. *Test Data Generation.* The test data generation function is made up of the following subfunctions:

(1) Card ID decoder (para 7-13)
(2) Card to binary logic (para 7-14)
(3) Memory Y address (para 7-15)
(4) Circuit test complete detector (para 7-16)
(5) Test pattern memory (para 7-17)
(6) Test pattern memory buffer (para 7-18)
(7) Circuit mask memory control (para 7-19)
(8) IC enable control (para 7-20)
(9) Mask memory control (para 7-21)
(10) Control word memory (para 7-22)
(11) I/O mask memory (para 7-23)

d. *Test Data Control.* The test data control function is made up of the following subfunctions:

(1) Card ID decode for clock insertion (para 7-24)
(2) Test clock control logic (para 7-25)
(3) Probe control logic (para 7-26)

e. *Test Data Compare.* The test data compare function is made up of the following subfunctions:

(1) Data compare logic (para 7-27)
(2) Error detect logic (para 7-28)
(3) Lamp driver logic (para 7-29)

f. *Front Panel.* The front panel consists of the lamp test logic (para 7-30) and the front panel including connector J6, connector J7, and terminal board TB101 (refer to Vol. 3, FO-24).

g. *MTS Interface.* The MTS interface (para 7-31) consists of connector J4, umbilical cable W210, and, for the MTS-to-MTS type test, card number 1144.

h. *Self-Test.* The self-test function is described in paragraph 7-32.

7-8. State Logic (fig. 7-9). The state logic is located in the left-hand card cage. The function of the logic is to sequence through the test procedure. The test procedure sequence is made up of 10 states from start to completion. Each state is represented by a D-flip-flop. The flip-flops, numbered one thru ten, are set in sequence by events and conditions, beginning with state one. The setting of the next state resets the previous state. The states are:

One: idle-system power on
Two: probe connected to CUT
Three: continuity Test
Four: system power off
Five. open reed relay-isolate CUT from system power
Six: probe power on to CUT
Seven: functional test
Eight: probe power off
Nine: close reed relay
Ten: test completed

a. *State One Idle and State One Set Logic.* State one is set in three ways:

(1) When power is initially applied to the MTS, the DEV DR INH (HCDD101 /HCDIDO3 signal is applied to the state one set logic, which provides the ST-1 set signal to state one.
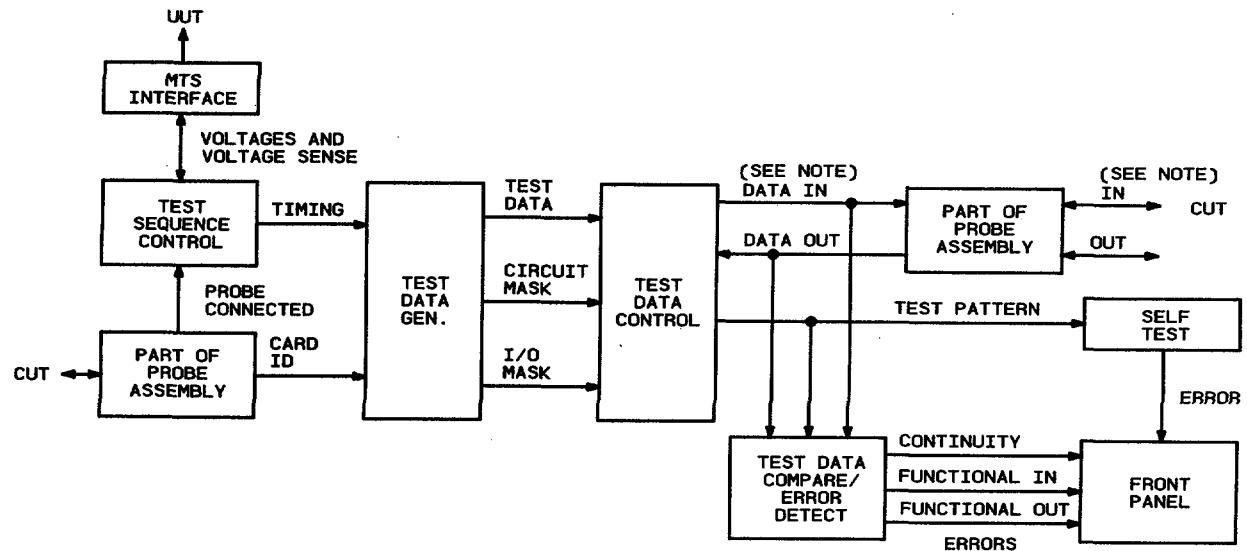
NOTE:

NUMBER OF DATA IN/DATA OUT
LINES VARY WITH CUT ID AND ARE
SELECTED BY I/O MASK. UNUSED
LINES ARE FORCED LOW BY CIRCUIT
MASK.

MS 428277

Figure 7-8. MTS Functional Block Diagram

(2) The display reset signal (HBFBFS), with the probe connected signal (HBB15A) present, also sets state one.

(3) When the MTS has completed the test cycle for the first card it is in state 10 and the state 10 signal (HBST0Q) to the fire OS logic is high. When the probe is disconnected, the probe connected input signal (HBB15A) to the fire OS logic goes high, producing the - fire OS=L signal (HBSB8O). A 40 ms delay, 40 MS OS clock signal (HC2OSP), is applied to state one idle. The data input to state one idle, SYNCed 1 SEC OS3* (HBKC3AV), is high because of the high HBB15A to the state input logic, so state one is set. State one set is the idle state in which the MTS waits for the probe assembly to be connected to the CUT. When state one is set, HBST1Q is high, HBST1P is low, HBST1AV is low, and HBST1OV is high. HBST1Q goes to the state two probe connected input and to the card ID decoder. HBB51OV (probe connected) goes to the system power on/off logic, turning on system power. HBST1P goes to the error detection logic. HBST1AV goes to state ten of the state logic, to the reset logic, and to the card ID decoder for clock insertion. HBST1OV goes to connector J7, which is accessible on the front panel assembly. State one is reset by the low HBST2P signal from state two.

b. *State Input and Fire 1 SEC OS Logic fig 7-9).* During test of the initial card, the state input logic

accepts the low probe connected signal (HBB15A), the 1 SEC OS clock signal (HC1OSP), and the 1-MHz system clock signal (HBT1AOV) to produce the outputs: probe on delay (HBKC1Q), 1 SEC OS2 (HBKC2Q), 1 SEC OS3 (HBKC3Q), and 1 SEC OS3* (HBKC3AV). See figure 7-10 for timing of signals. In state ten (HBSTOQ high), when the probe is disconnected (HBB15A high), the +5v pull up signal (SPI018) is provided to the card ID decoder. The output (HC1OSP) of the one-shot goes to the state input logic and to state one. With HBKC3AV high, when the trailing edge of HC1OSP goes positive, state one is set.

c. *State Clock Logic.* The state clock logic produces event-controlled clocks and outputs to control the sequencing of the test states. The LSNS 1.2 3 output (HBKAEA) low indicates that the system voltage level sensor inputs (HC51LO, HC52LO, HC53LO) are high, which indicates that system voltage is less than 1v. The H-SNS 1-2-3 output (HBKAFOV) high indicates that the system voltage level sensor inputs (HC51MO, HC52MO, HC53MO) are high, which indicates that system voltage is more than 4.4v. The system voltage is turned on by state one and off by state four. When system power is on and state two (HBST2Q) is set high, the 500-kHz system clock (HB5OOOV) clocks out the ST3 CLK SYS PWR=H signal (HBKAHA). When system

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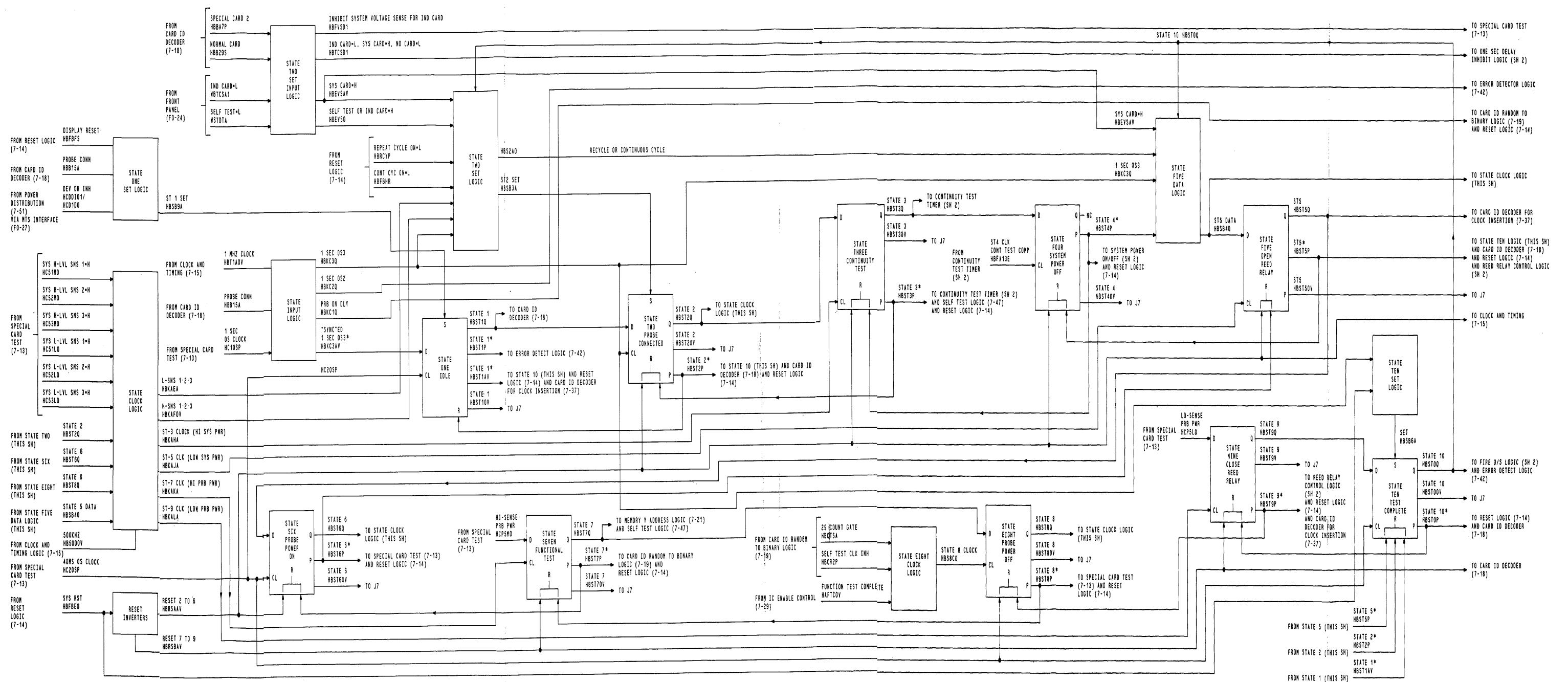
Figure 7-9. State Logic Block Diagram (Sheet 1 of 2)

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Change 1   7-145/(7-146 blank)
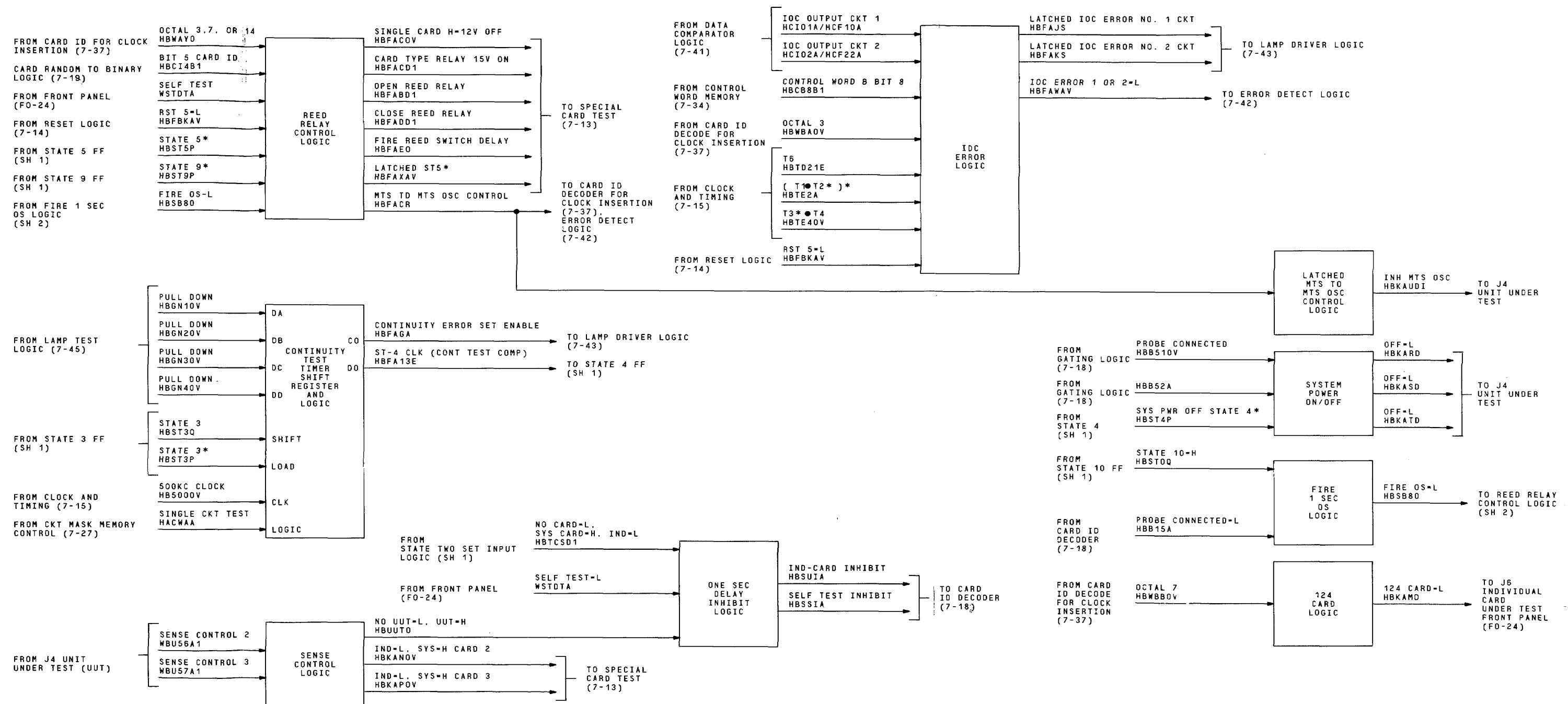
Figure 7-9. State Logic Block Diagram (Sheet 2 of 2)

Change 1   7-147/(7-148 blank)
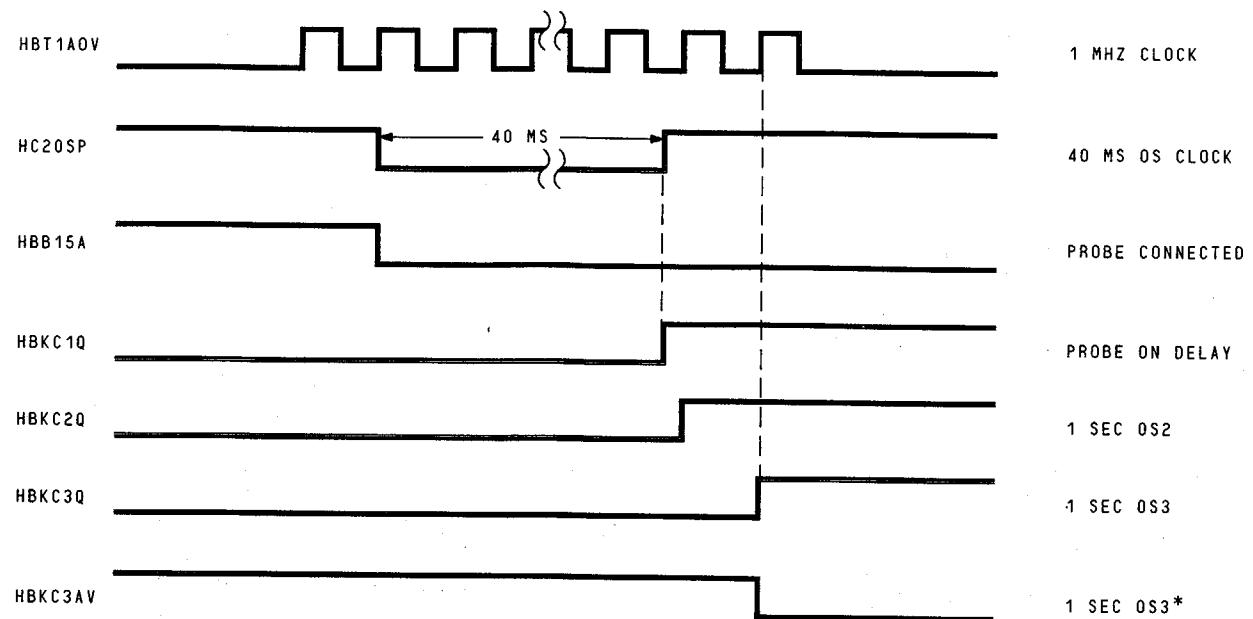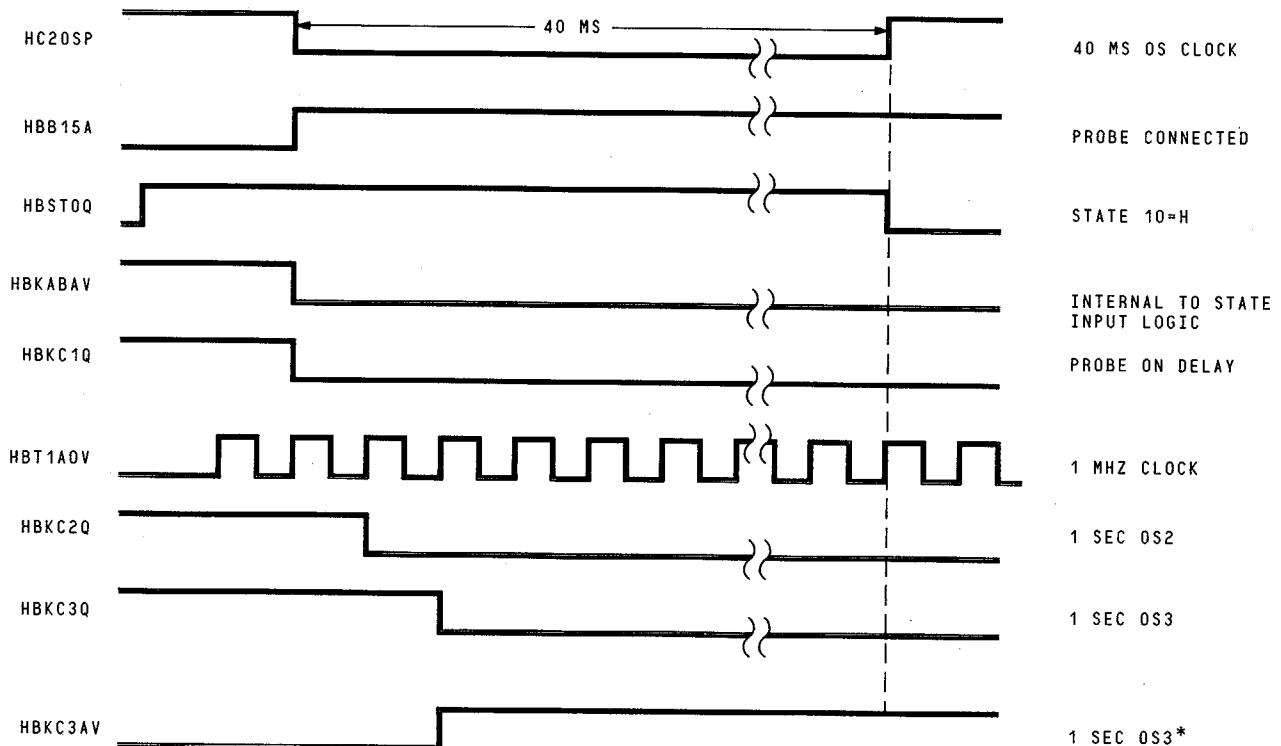
Figure 7-10. State Input Logic Timing Diagram

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power is off and the ST5 data signal (HBSB40) is high, HB500OV clocks out the ST-5 CLK SYS PWR = L signal (HBKAJA). When state six (HBST6Q) is set high, HB500OV clocks out the ST-7 CLK PRB PWR = H signal (HBKAKA). When state eight (HBST8Q) is set high, HB500OV clocks out the ST-9 CLK PRB PWR = L signal (HBKALA).

    d. State Two Set Input Logic. When a card is being tested, either the special card two signal (HBBA7P) or the normal card signal (HBB29S) from the card ID decoder is low. This produces the card=H (HBTCSD1) output to the card or the self-test logic of the state logic. A low HBTCSD1 is produced when both card inputs are high (no card). A low HBTCSD1 is also caused by a low IND card=L signal (WBTCSA1), indicating an individual card test. The self-test= L input (WSTDTA) from the front panel assembly is low during self-test. HBTCSD1 and WSTDTA produce the system card or (self-test or individual card test) outputs (HBEVSAV and HBEVSO, respectively). When the probe is connected to a system card, HBESAV is high. In self test or individual card test, HBEVSO is high. Both signals are applied to the state two set logic of the state logic. When no card is connected to the probe assembly (HBTCSD1 low), or during self-test or individual card test, the inhibit system voltage sense output (HBFVSD I) is provided to the special card test logic.

    e. State Two Set and State Two Probe Connected Logic. State two is set three ways:

      (1) During the initial card test procedure, the high output HBST1Q of state one is clocked in to state two by the positive-going trailing edge of the I SEC OS3 gate (HBKC3Q) from the state input logic, setting the state two output (HBST2Q) high.

      (2) State two is also set in two other ways by the ST-2 set signal (HBSB3A). When STATE 10 (HBSTOQ) is set high and HBKC3Q remains high the ST-2 set output (HBSB3A) goes low under two separate conditions:

        (a) When system power is on (HBKAEA and HBKAFOV high) and the probe is connected to a system card (HBEVSAV high).

        (b) In self-test or an individual card test (HBEVSO high) when either REPEAT CYCLE (HBRCYP low) or CONTINUOUS CYCLE ((HBFBHR low) is selected. When state two is set, HBST2Q is high, HBST20V is high, and HBST1P is low. HBST2Q goes to the state 3 data input and to the state clock logic of the state logic. HBST2P goes to the reset input of state ten, to the card ID decoder logic, and to the reset logic. HBST20V goes to J7 on the front panel assembly. State two is reset by a low state three (HBST3P) or by a low reset 2-to-6 signal (HBRSAAV).

    f. State Three Continuity Test. The continuity test is performed during state three, which is set when

HBST2Q from state two is clocked in by the ST-3 clock 7-1 50 (HI SYS POOR) signal (HBKAHA). When set, the high state-three signal (HBST3Q) is sent to the continuity test timer logic of the state logic to start the timer. The timer provides a continuity test complete signal to set state four, which, in turn, provides an output to reset state three. HBST3Q is also the data input to state four. The low state-three output (HBST3P) is also sent to the continuity test timer, to the self-test logic, and to the reset logic. HBST30V is sent to connector J7. State three is also reset by the reset 2-to-6 signal (HBRSAAV) during system reset.

    g. Continuity Test Timer (fig. 7-9 and 7-11). The timer controls the period during which the continuity test occurs. When state three is in the reset condition, HBST3Q is low and HBST3P is high. The four pulldown signals (HBGN1OV to HBGN40V) are parallel logic zero inputs to the shift register. The inputs are loaded by the first HB500OV clock that occurs after reset of state three. When state three is set, HBST3Q goes high and HBST3P goes low, which causes the HB500OV clock input to the register to shift the parallel loaded zeros right, and to load the high HBST3Q in serially as a logic one to the leftmost position. As the clock continues, the serial-input logic ones are shifted to the output line of HBFA13E. On the fifth clock (8 us), HBFA13E goes high. This output signal, ST-4 CLK CONT TEST COMP (HBFA13E), sets state four. When state four is set. The low state four signal (HBST4P) resets state three, completing the continuity test. At the same time, when the single circuit test (HACWAA) is high (not active), the clock before HBFA13E provides the low continuity error set enable output (HBFAGA) to the lamp driver logic. When HACWAA is low (testing a single circuit card), HBFAGA is high and the continuity error lamps are not enabled.

    h. State Four System Power Off. State four turns off the system power to the unit under test when it is set at the completion of the continuity test. State four is set when HBFA13E clocks in the state three (HBST3Q) data input to state four. When state four is set, the state 4* output, (HBST4P) is low. HBST4P is applied to the state five data logic and to the system power on/off logic of the state logic and to the reset logic. The high state four (HBSTOV) output is sent to connector J7. State four is reset by the low state five* (HBST5P) when state five is sent, or by the reset 2-to-6 signal (HBRSAAV).

    i. State Five Data Logic and State 5 Open Reed Relay. State five, when set, causes the reed relay of the CUT to open, allowing the MTS to power the CUT. State five is set when the ST-5 data signal (HBSB40) is high and the ST-5 CLK (LOW SYS POOR) signal (HBKATA) from state clock logic goes high. HBSB40 is high under two separate conditions:

A. CONTINUITY TEST TIMER SHIFT REGISTOR
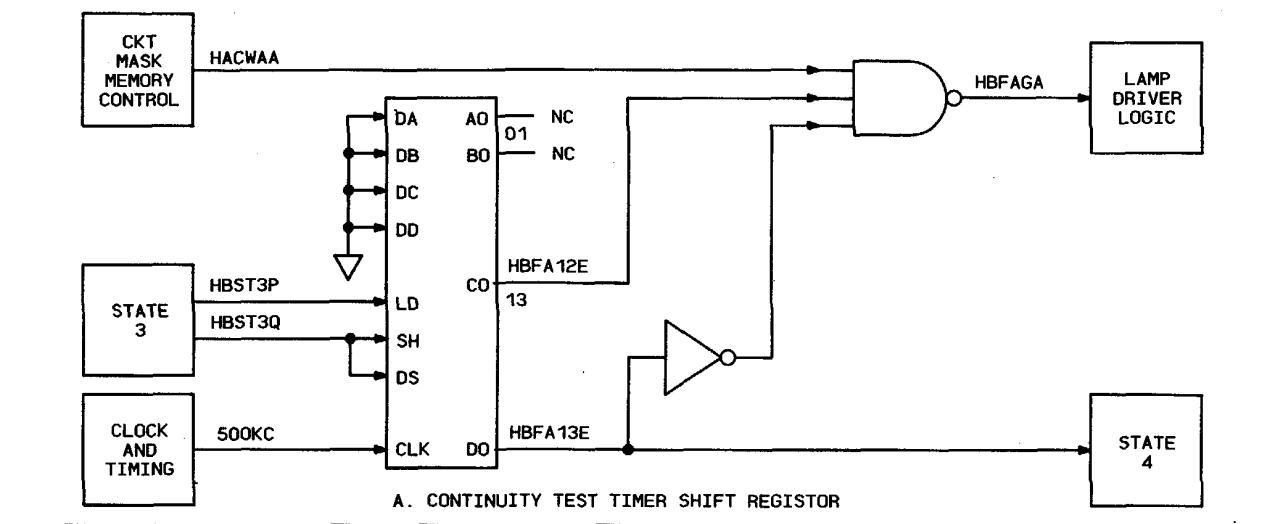
		INPUT					OUTPUT			
		DA	DB	DC	DD		AO	BO	BO	BO
CLOCK	RESET	0	0	0	0		0	0	0	0
1	SET	1	0	0	0		0	0	0	0
2	SET	1	1	0	0		1	0	0	0
3	SET	1	1	1	0		1	1	0	0
4	SET	1	1	1	1		1	1	1	0
5	SET	1	1	1	1		1	1	1	1

LOAD = $HBST3P_H \cdot HBST3Q_L$ = RESET

SHIFT RIGHT = $HBST3P_L \cdot HBST3Q_H$ = SET

B. TRUTH TABLE
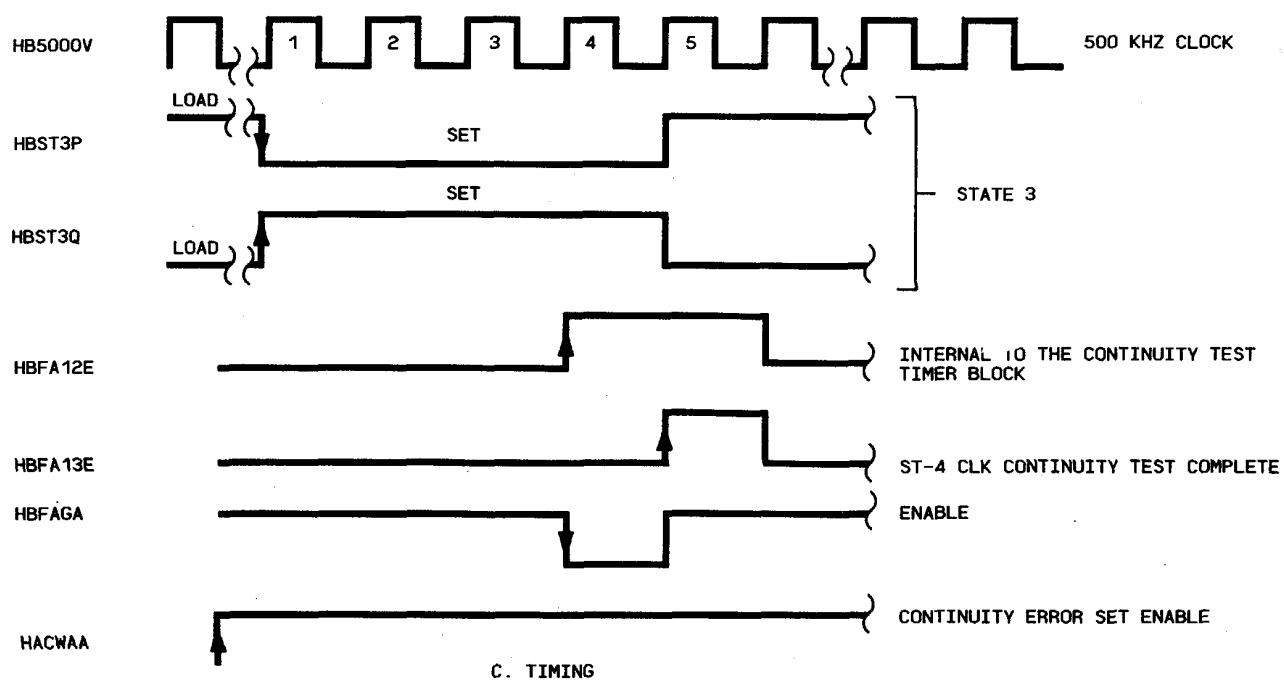
C. TIMING

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Figure 7-11. Continuity Test Timer Timing Diagram

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(1)   In the normal test sequence, the low HBST4P from state four that is applied to the state five data logic produces a high HBSB40.

(2)   HBSB40 also goes high under the following conditions (inputs to state five data logic are high):

State ten set (HBSTOQ high)
Test probe connected (HBKC3Q high)
System card tested (HBEVSAV high)
Either repeat or continuous cycle selected on front panel (HBS2AO high)

When state five is set, the ST-5 signal (HBSTSQ) is high and the ST-5* signal (HBSTSP) is low. HBSTSQ goes to the clock ID decoder for clock insertion. HBSTSP goes to the state 10 logic and reed relay control logic of the state logic, to the card ID decoder, and to the reset logic. HBSTSOV goes to connector J7. State five is reset by the low state-six signal (HBST6P) when state six is set, or by the reset 2-to-6 signal (HBRSAAV).

j.   Reed Relay Control Logic. The outputs of this logic provide control of the probe assembly voltage relays and, through the special card test logic, provide control of the reed relay on the CUT that removes system power from the CUT during functional test. Five of the seven outputs of this logic occur when state five is set (HBST5P low), as follows:

(1)   Single card H = 12V off (HBFACOV) active high when octal 3, 7, or 14 (HBWAYO) is low (not a 587107, 587124, or 10281629 card).

(2)   Card type relay 15V on (HBFACD1) active low when not in self-test (WSTDTA high) and bit-5 card ID (HBCI4B1) is high.

(3)   Open reed relay (HBFABD1) is active low.

(4)   Latched state 5* (HBFAXAV) is active low.

(5)   Fire reed switch delay (HBFAEO) is high.

The other two outputs (HBFADD1 and HBFACR) are ■ forced to a nonactive state by HBST5P. Either an HBST9P low or an HBSB80 low input also produces the fire reed switch delay (HBFAEO) high. HBST9P low or the reset 5=L signal (HBFBKAV) provides the active high MTS to MTS OSC control (HBFACR) to the latch MTS to MTS OSC control logic, and the active low close reed relay (HBFADDI). All signals except HBFACR go to the special card test logic.

k.   State Six Probe Power On. When state six is set, the MTS provides 5v to the CUT through the probe assembly. State five starts the 40-ms delay one-shot. State six is set when the positive-going trailing edge of the 40 MS OS clock (HC20SP) clocks in the high HBST5Q from state five. When state six is set, HBST6Q enables the state seven clock output of the state clock logic. HBST6P goes to the special card test for turning on probe power, and to the reset logic.

HBST60V goes to J7. State six is reset when state seven is set by the state 7* signal (HBST7P) or when the reset 2-to-6 (HBRSAAV) goes low.

l.   State Seven Functional Test. Functional testing is initiated when state seven is set. It continues until the functional test is completed. The time for functional testing varies with the different types of cards. Timing is initiated by state seven when it is set. State seven is set by the ST-7 CLK (HI PRB POOR) signal (HBKAKA). HBKAKA goes high and clocks in the active-high HI-SENSE PRB PWR signal (HCP5MO) from the special card test. When set, state seven (HBST7Q) is high, state seven (HBST7P) is low, and state seven (HBST70V) is high. HBST7Q goes to the memory Y address logic and, through the self-test logic, goes to the clock and timing logic for starting the functional test timing. HBST7P goes to the card ID random to binary logic and to the reset logic. HBST70V goes to J7. State seven is reset by the low reset 8* signal (HBST8P) from state eight, or by the low reset 7-to-9 (HBRSBAV) signal.

m.   IOC Error Logic (fig. 7-9 and 7-12). During state seven functional testing occurs for the CUT. The CUT identifies the test pattern to be used during the test. The functional test consists of inputting known logic levels to the CUT and comparing the CUT output to known logic levels. The comparison is made in the data compare logic which provides error signals to the lamp driver logic. This, in turn, provides drive to the front panel indicators and to the error detection logic which controls the GO/NO-GO indicators. The exception is the input/output controllers (IOCs) 1 and 2. If the CUT is an IOC card, the data compare logic error output for the IOC 1 or 2 card is sent to the IOC error logic. The function of IOC error logic is to make the test comparison when the CUT is identified by the card ID as an IOC card. It also provides an output to the error detector logic to control the GO/NO-GO indicators, and, an IOC 1 or 2 error signal to the lamp driver logic for control of the front panel indicators. (See figures 7-9 and 7-12.) Reset 5=L (HBFBKAV) or (T1 T2*)*(HBTE2A) resets the IOC error logic for 1 and 2 (IOC NO. 1 1atch signal (HBFAMR) is high). With IOC output CKT 1 and 2 signals (HCF1OA and HCF22A) high (no error) and with control word B BIT 8 and octal 3 signals (HBCB8B1 and HBWBAOV) high, when T6 (HBTD21E) goes high, the IOC logic is set (HBFAMR low). With the logic set, when T3*T4 (HBTE40V) occurs, the output signals (HBFAJS and HBFAKS) remain low (no error) and HBFAWAV remains high (no error). With an error condition in CKT NO. 1, for example, HCF10A goes low; the logic does not set when HBTD21E occurs. With HBTD21E\and HBFAMR high, when HBTE40V occurs, the output HBFAJS to the lamp driver is latched high (error), and the output HBFAWAV goes low, which, through the error detector logic, turns off the green GO indicator on the front panel.
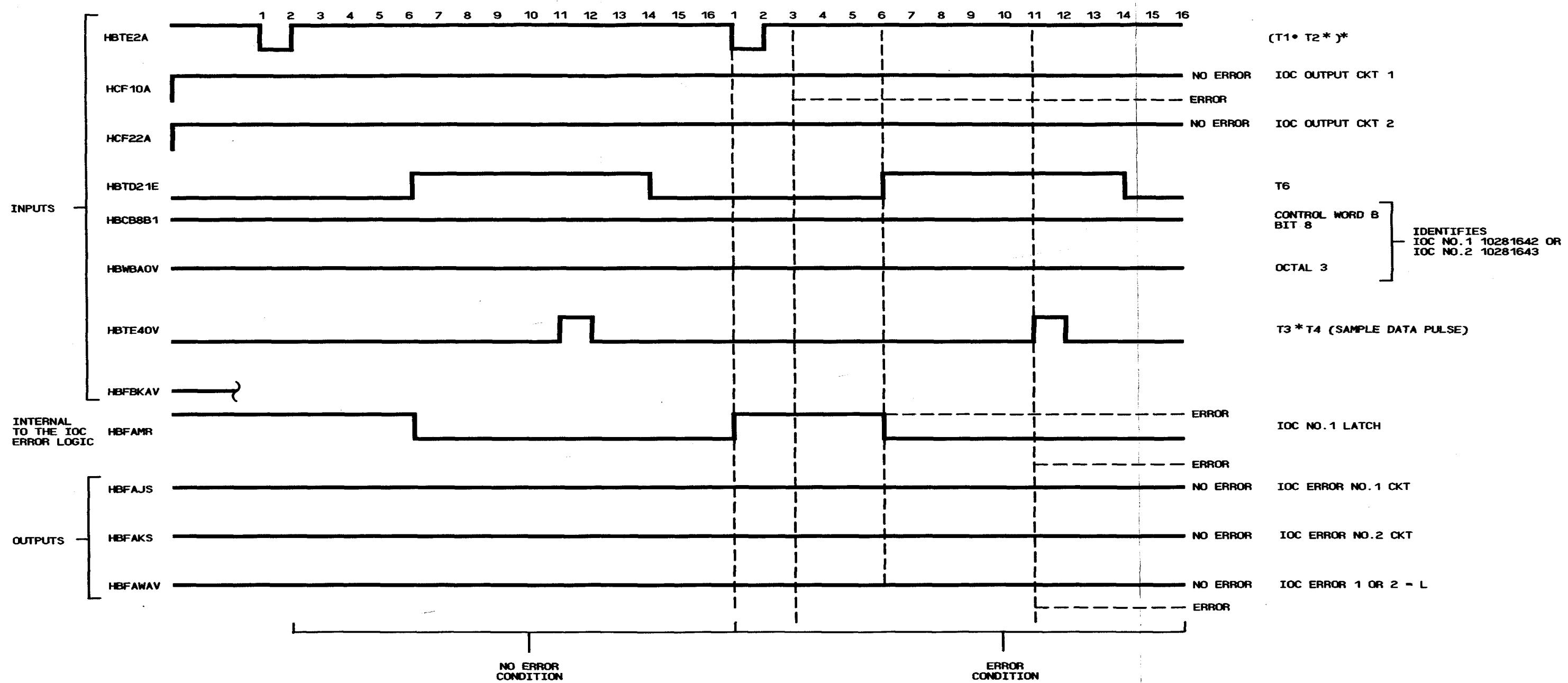
Figure 7-12. IOC Error Logic Timing Diagram

7-153/(7-154 blank)

n. *State Eight Clock Logic and Probe Power Off.* State eight, when set, turns off the power to the CUT from the MTS and eventually sets state nine. State eight is set when the high HBST7Q is clocked in by the active high state eight clock (HBS8CO). HBS8CO goes high under two conditions: the state eight clock is inhibited by the low self-test CLK INH (HBCR2P), which holds HBS8CO low while self-test is in progress. When the self-test is completed, the 29 count gate (HBCTSA) goes low forcing HBS8CO high, setting state eight. At the end of actual arc testing, the function test complete signal (HAFTCOV) goes high, providing the high HBS8CO, setting state eight. When state eight is set, the state 7 signal (HBST8Q) goes high, the state 8* signal (HBST8P) goes low, and the state 8 signal (HBST8OV) goes high. HBST8Q goes to the state clock logic of the state logic where it enables the output clock for setting state nine. HBST8P goes to the special card test logic for turning off the MTS probe power to the CUT. HBST8P also goes to the reset logic. HBST80V goes to J7. State eight is reset by the state nine* signal (HBST9P) when state nine is set. Reset also occurs when the reset 7-to-9 signal (HBRSBAV) goes low.

o. *State Nine Close Reed Relay.* When the MTS power to the CUT is removed, state nine is set. The setting of state nine closes the reed relay on the CUT, reapplying system power to the CUT. State nine set also starts the 40-ms delay for clocking state ten. State nine is set when the active high LO-sense PRB-PWR signal (HCPSLO) is clocked in by the high state nine CLK (LOW PRB POOR) (HBKALA) signal. When set, state 9 signal (HBST9Q) is high, state 9 signal (HBST9P) is low; and state 9 signal (HBST9OV) is high. HBST9Q goes to state ten. HBST9P goes to the relay control logic of the state logic for closing the reed relay and starting the 40-ms, one-shot delay. HBST9P also goes to the reset logic and card ID decoder for clock insertion. HBST9OV goes to J7. State nine is reset by the low state ten* (HBSTOP) when state ten is set, or by the low reset 7-to-9 (HBRSBAV).

p. *State Ten Set Logic and State Ten.* When the probe is connected, indicated by a high I SEC OS 3 signal (HBKC3Q), and the system reset signal (HBFBEO) goes high, the state ten set logic produces a low set signal (HBSB6A) which sets state ten. It is also set when the 40-ms OS clock (HC2OSP), from special card test, clocks in the high HBST9Q on its positive going trailing edge. When state ten is set, state 10 signal (HBST0Q) goes high, state 10* (HBST0P) goes low, and state 10 (HBST0OV) goes high. On the state logic, HBST0Q goes to state two, state five, and the fire OS logic for starting the l-see one-shot, which sends the fire 0S = L signal (HBSB80) to the card ID decoder. HBSB80 also goes to the reed relay control logic for firing the 40 ms one-shot delay (HC2OSP). HBST0Q is also used for timing by the error detect logic, which turns off either the GO or NO-GO indicator. HBST0P goes to the reset logic and to the card ID decoder. HBST0OV goes to J7. State ten is reset

either by a low state five* (HBSTSP) a state two* (HBST2P), or a state one* (HBST1P) when each is set. When set, state 10 is the end of a complete testing sequence. Depending on four conditions, four different operations can occur when state ten is set:

(1) With state 10 set, removing the test probe from the CUT causes state one to set after a 1-sec delay, resetting state 10 and turning on system power.

(2) If the probe handle remains connected at the end of system card test and CONTINUOUS CYCLE OR REPEAT CYCLE switches are selected, state 10 set causes state five to set and state five set causes state 10 to reset.

(3) If, for some reason the system power is on and the probe is connected to a system card when state 10 is set, (normally system power is off in state 10) state two is set, which resets state 10.

(4) In self-test or in the test of an individual card, with either REPEAT or CONTINUOUS CYCLE selected, state 10 causes state two to set, which resets state 10.

q. *Sense Control Logic.* The function of this logic is to provide a pulldown to the system voltage sense circuits in the special card test logic which simulates system voltage above 4.4v when the umbilical cable to the unit under test (UUT) is not connected (as in individual card test). When the umbilical is connected to the UUT, the output allows the system voltage level to control the output of the sensing circuits in the special card test logic. Sense controls two and three (WBU56A1 and WBU57A1) are not present when the UUT is disconnected and all outputs (HBUUTO, HBKANOV and HBKAPOV) are low. When the UUT is connected, a low WBU56A1 causes HBUUTO and HBKANOV to go high, and/or a low WBU57A1 causes HBUUTO and HBKAPOV to go high. HBUUTO goes to the 1-sec delay inhibit logic of the state logic, and HBKANOV and HBKAPOV go to the special card test logic.

r. *1-Sec Delay Inhibit Logic.* The function of this logic is to inhibit firing of the 1-sec one-shot in the special card test during self-test, or when the umbilical is connected to the UUT and the test probe is not connected to the CUT. The active low no-card inhibit (HBSU1A) to the card ID decoder is produced where HBTCSD1 is low (no card) and HBUUTO is high (UUT connected = system card). The active low self-test inhibit (HBSS1A) to the card ID decoder is produced when WSTDTA (self test) is low and HBTCSD1 (no card) is low.

7-9. Special Card Test Logic (fig. 7-13). The special card test logic is located on pcbs in the analog card cage. The special card test logic consists of control circuits which control the application of operating voltages to MTS test connectors J1, J4, and J6. A sense line comparator senses CUT and UUT power distribution lines to determine if power is on or off on the CUT or UUT. The one-shot circuits provide 1-sec and 40-ms delay signals.

a. *Reed Relay Control*. The reed relay control consists of transistor switches, which control the application of power and control signals to the magnetic coil and card type latch relays on the probe assembly. During state five, the open reed relay (HBFABD1) signal is actuated low. The low input signal (HBFABD1) drives the open reed relay output signal (HCNRGA) to its deactuated condition. This, in turn, deenergizes one-half the magnetic coil, which, in turn, causes the reed relay on the CUT to open. The close reed relay input signal (HBFADD1) operates in the same way as the HBFABD1 signal. The HBFADD1 signal is actuated low during state nine to deactuate the close reed relay output signal (HCDNRGA). The coil +15v (HC+ 15V3) signal supplies +15v to the center tap of the magnetic coil. The HC+1 5V3 signal, in conjunction with the active low HCNRGA and HCDNRGA signals, energizes the magnetic coil. The probe +15v control signal (HBFACDI)is actuated during state five, and, in turn, actuates probe +15v signal (HC+15R1). When active, the HC+15R1 signal applies +15v to the four card ID latch relays in the probe assembly.

b. *Clock Pullup Control*. The clock pullup control consists of a NAND gate driver and a transistor switch. The clock pullup control signal, (HBWBDA) when low, switches the clock pullup signal (HC6020) to its high state. When high, the HC6020 signal applies +5v to clock pullup circuits in the probe assembly.

c. *Probe +5v Control*. The probe +5v control consists of a latch, NAND gate drivers, and transistor switches. The latch is set by a low state six signal (HBST6P). When set, the latch causes the transistor switches to turn on and actuate the probe +5v signal (HCPRB+51). The probe +5v signal applies +5v to the CUT through the probe assembly. The probe power enable (HACWAOV), when low, inhibits one of two transistor switches in the circuit. The state eight (HBST8P) or reset (HBFBKAV) signal resets the latch and turns off the probe +5v signal. The power-on sense signal (HCQIMTR) monitors the base of one of the power transistor switches to determine when probe power is turned on. A high HCQIMTR signal applied to the sense line comparator develops a high probe power-on signal (HCPSMO) and a low probe power-off signal (HCP5LO). Conversely, a low HCQIMTR signal develops a low HCP5MO signal and a high HCP5LO signal.

d. *UUT Power Control*. The UUT power control consists of a NAND driver, switch driver, and transistor switches. The -15v UUT control signal, (HBWBCA) when high, turns on the-15v (HC-15v) supply. The-15v is applied to the UUT through connector J4 and wiring harness W210. The +12v UUT control (HBFACOV) signal, when high, allows +12v (HC+12V7) to be applied to the UUT. When low, the HBFACOV signal turns off the +12v to the UUT.

e. *Sense Line Comparator*. Six identical data comparator circuits monitor certain MTS and UUT 7-1 56 voltages and signals to determine their logic levels. Each

sense line comparator consists of two operational amplifiers used as voltage level comparators and two NAND gates used to output the comparison results. The UUT +5v bus sense signal lines (HCSNSI7 HCSNS2, and HCSNS3) monitor the UUT +5v bus to determine if power is present-in the UUT. When the voltage level of the HCSNS1, HCSNS2, and HCSNS3 input signals is greater than 2.5v, the UUT + 5v bus on signals (HC51 MO, HC52MO, and HC53MO): are actuated high to indicate the presence of + 5v in the UUT. When the HCSNS1, HCSNS2, and HCSNS3 signals are less then +2.5v, the UUT +5v bus off signals (HC51LO, HC52LO, and HC53LO) are actuated high. The sense inhibit signal (HBFVSD1) when low, inhibits sensing of the HCSNS1, HCSNS4, and HCSNS5 signal lines. The sens B inhibit (HBKADOV) and sense C inhibit (HBKAPOV) signals, when low, inhibit sensing of the HCSNS2 and HCSNS3 signal lines, respectively. The UUT pullup power sense signal lines (HCSNS4 and HCSNS5) monitor the UUT pullup power bus in the UUT. When the HCSNS4 and HCSNS5 signals are high, the UUT pullup power-on signal (HCPUFA) is actuated low to indicate that pullup power is present on the UUT. The HBFVSD1 signal, when low, inhibits sensing of the HCSNS4 and HCSNS5 signal lines. The HCSNS4 and HCSNS5 comparator (Comparator F) applies two active high pullup power-on (HCPU10 and HCPU20) signals to the 1-see delay one-shot. The power-on sense signal (HCQ1MTR) monitors the base of the probe +5v output transistor switch. A HCQIMTR signal when greater than +2.5 volts indicates that the probe +5v is turned on. The high HCQ1MTR signal actuates the probe power on signal (HCP5MO), and a low HCQIMTR signal actuates the probe power off signal (HCP5LO). These signals are active low. The card ID TP21 signal (HCTP210) is one of six card ID signals provided by the CUT connected to the probe assembly and has three states; open, GND, and 3.5v. The HCTP210 signal, when high, develops a high card type TP21H (HC21CO) and a low card ID TP21 (HC21BO) signal. Conversely, when the HCTP210 signal is low, a low HC21CO signal and a high HC21BO signal is developed. When HCTP210 is open, HC21BO and HC21CO are low. The HC21CO and HC21BO signals are part of the card ID code.

f. *1 Sec Delay One-Shot*. The 1-sec delay one-shot generates an active low 1-sec delay pulse (HC1OSP*) when enabled by the active low probe connected (HBB53A) and the active high signals (HCPU1O and HCPU20). The l-see delay pulse inhibits the test sequence for one second when the probe is connected to the CUT. The l-see delay prevents spurious signals generated during the probe connecting process from being misinterpreted and used as valid data.

g. *40-Ms Delay One Shot*. The 40-MS delay one shot produces an active low 40-MS delay pulse to delay test sequence operations when the CUT reed relays are
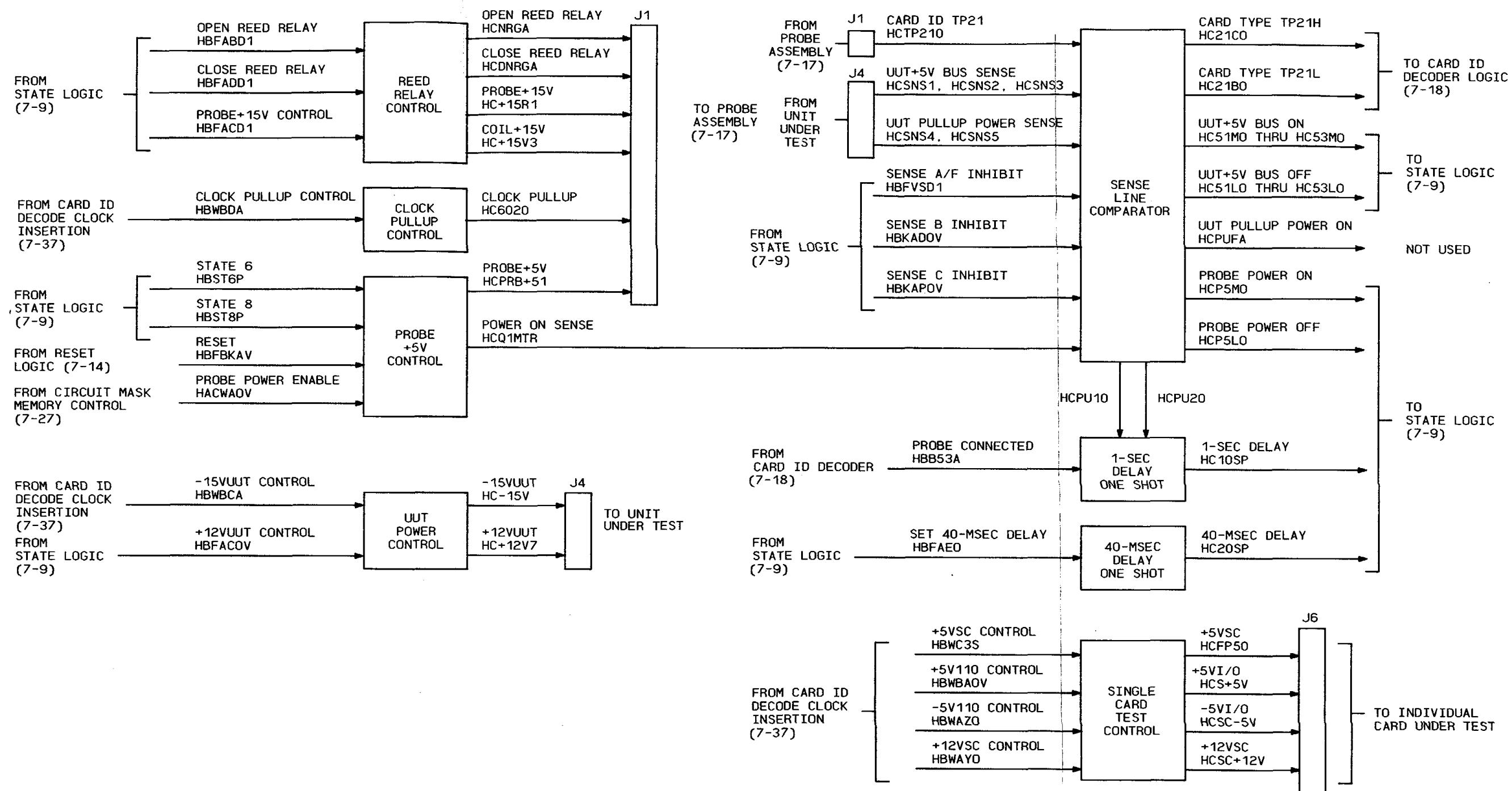
Figure 7-13. Special Card Test Logic Block Diagram

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opened or closed. The 40-MS delay prevents a spurious signal generated by the reed relays from being misinterpreted and used as valid data. The set 40-MS delay signal (HBFAEO) is actuated high by states one, five, and nine. The one-shot generates an active low 40-MS pulse (HC20SP) each time the HBFAEO signal is driven high.

h. *Single Card Test Control.* The single card test control consists of transistor and FET switches and associated NAND and inverter driver circuits. The single card control turns on the required dc voltages to the CUT connected to J6. The + SVSC control signal, (HBWC3S) when low, turns on the +SVSC (HCFPSO) and applies it to connector J6. Similarly, the active low +SV110 control (HBWBAOV), -SV110 control (HBWAZO), and +12VSC control (HBWAYO) signals turn on the +SV110, -5V110, and +12VSC voltages to connector J6. Connector J6 is used during individual card test procedures.

7-10. Reset Logic (fig. 7-14). The reset logic is located on pcbs in the left-hand and right-hand card cages of the MTS. Its primary functions are to provide latch circuits and reset signals. The latch circuits are used in conjunction with front panel switches to initiate the appropriate logic control responses. The reset signals are used throughout the MTS logic to control major event sequences.

a. *Latch Circuits.* Two types of latch circuits are used. The first consists of a standard set-reset latch, and the second consists of a set-reset latch and an associated flip-flop with reset logic. Each of the circuits is described as follows.

(1) The display reset latch is a set-reset circuit controlled by inputs originated by the DISPLAY RESET front panel switch, a momentary-action pushbutton. The inputs and associated outputs are shown in table 7-12 for a sequence of switch actions; from 1-off to 2-on, and 3-op again, which produce a square pulse output.

(2) The repeat cycle latch and flip-flop consists of a set-reset latch and an associated flip-flop. The related switch inputs are from the momentary-action REPEAT CYCLE switch on the front panel. Unlike the straight latch circuit, this circuit sets a flip-flop which remains set until a reset condition is detected. The sequence is shown in table 7-13. Once the flip-flop is set, HBRCYP remains low until the flip-flop is reset by a low-active input either for state five (HBST5P) or reset four (HBFBDAV).

(3) The continuous cycle latch circuit operates similarly to the display reset latch, with one major difference. The continuous cycle latch inputs from the CONTINUOUS CYCLE switch are the result of a two-state pushbutton switch action rather than a momentary action. Thus, the latch sets when the

pushbutton is pressed, and remains set until the pushbutton is pressed again. With the CONTINUOUS CYCLE switch off, the following levels are as shown:

SET LATCH (WBCCSA1) = 0 (low) RESET LATCH (WBCCRA1) = 1 (high)
CONTINUOUS CYCLE (HBFBHR) = 1 (high)
With the CONTINUOUS CYCLE switch on, the following levels apply:
WBCCSA1 = 1 (high) WBCCRA1 = 0 (low) HBFBHR = 0 (low)

(4) The self-test latch and flip-flop circuit operates exactly as described for the repeat cycle latch and flip-flop. The SELF-TEST front panel switch is a momentary-action type, which, when pressed, sets a flip-flop that remains set until it is reset. Reset is accomplished by a low-active signal either for end-of-test (HBCASA) or state 7* (HBCTRAV). With the SELFTEST switch off, the following input and output signal levels are as shown:

SET LATCH (WBSTSA1) = 0 (low)
RESET LATCH (WBSTRA1) = 1 (high)
SELF-TEST (HBFBIP) = 1 (high)

To set the flip-flop, the SELF-TEST switch is pressed, resulting in the following levels:

WBSTSA1 = 1 (high)
WBSTRA1 = 0 (low)
HBFBIP = 0 (low)

b. *Reset Logic.* The reset logic consists of two groups: no-state dropout logic, and reset gating and drivers, which are described as follows:

(1) The no-state dropout logic detects any time period whenever all the state logic levels are all reset. Under normal operation, at least one of the ten states is active. For example, state one is the idle state before the probe is connected. Therefore, all-states-reset (referred to as no-state) represents an MTS condition that can be considered as a type of locked-up or hanging state. The purpose of the no-state logic, therefore, is to initiate an automatic reset to force the MTS out of this no-state. Dropout logic consist of states one thru ten (HBST1AV, HBST2P to HBST9P, and HBSTOP). When all these levels are high, meaning no state is active, the no-state signal (HBFSSO) goes low. The remaining events ensure that state ten will go active by means of the reset gating and drivers and other logic controlled by its outputs.

(2) The reset gating and drivers provide an OR operation to detect any one of four possible reset conditions, as follows:

RESET 0N = L (HBFBFR)
OR
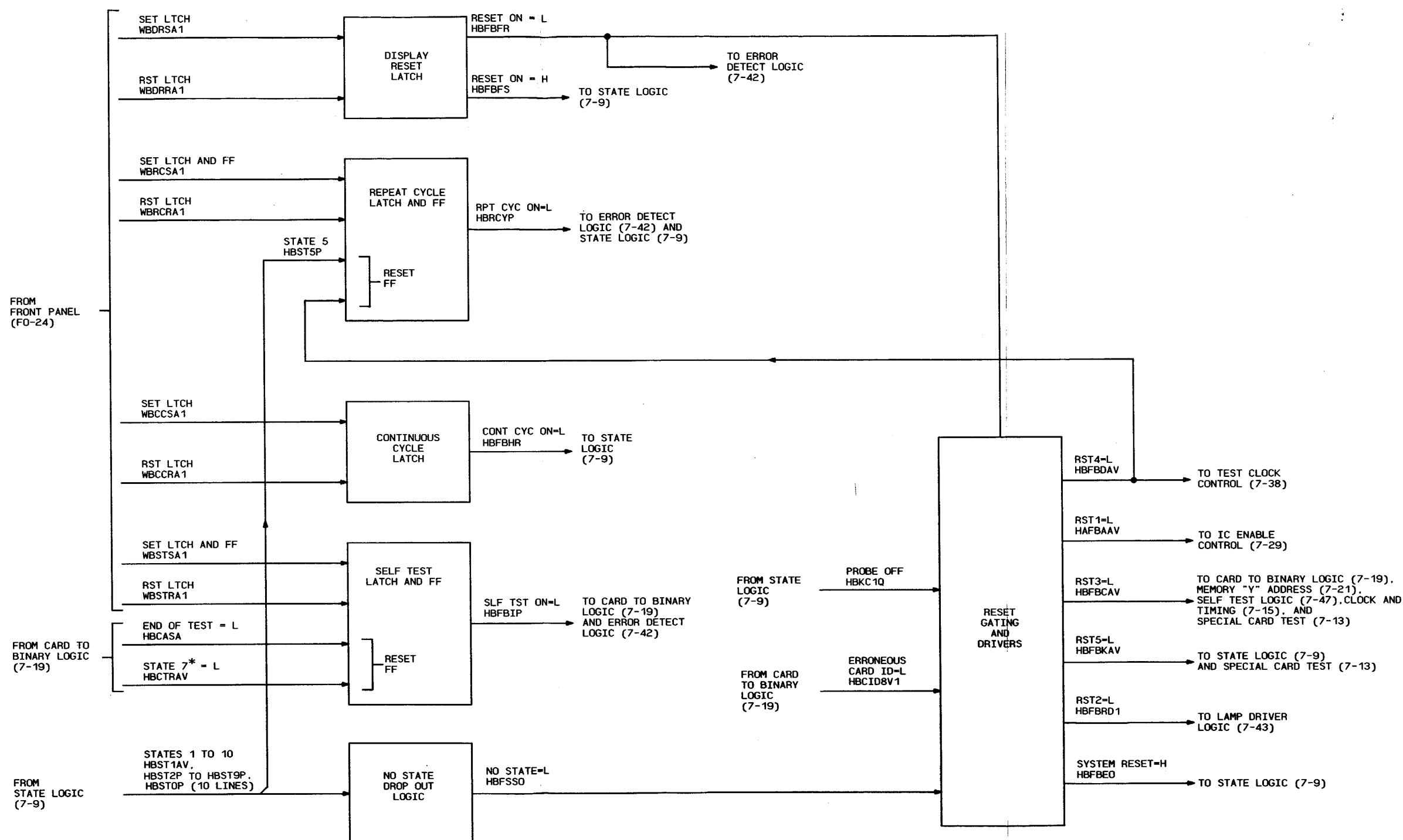
Figure 7-14. Reset Logic Block Diagram

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Table 7-12. Display Reset Latch Truth Table

Display reset latch inputs/outputs	Display reset switch conditions		
	1-OFF	2-ON	3-OFF
SET LATCH (WBDRSA1)	0	1	0
RESET LATCH (WBDRRA1)	1	0	1
RESET ON (HBFBFR)	1	0	1
RESET ON (HBFBFS)	0	1	0

Table 7-13. Repeat Cycle Latch and FF Truth Table

Repeat cycle latch and FF inputs	REPEAT CYCLE switch conditions		
	1-OFF	2-OFF	3-OFF
SET LATCH & FF (WBRCSA1)	0	1	0
RESET LATCH (WBRCRA1)	1	0	1
RPT CYC ON=L (HBRCYP)	1	0	0

PROBE OFF = L (HBKC1Q)
                OR
ERRONEOUS CARD ID = L (HBCID8V1)
                OR
NO STATE = L (HBFSSO)
Any one or more of these low-active inputs result in all
of the following reset outputs:
    RST1 = L (HAFBAAV)
    RST2 = L (HBFBRD 1)
    RST3 = L (HBFBCAV)
    RST4 = L (HBFBDAV)
    RST5 = L (HBFBKAV)
    SYSTEM RESET = H (HBFBEO)

7-11. Clock and Timing (fig. 7-15). Clock and timing
logic is located on pcbs in the left-hand card cage of the
MTS. The function of this logic is to generate the
primary clock and timing signals that synchronize the
sequence of operations for theMTS functional tests.
        a.   *Clock Generation Logic.* All timing is
referenced to a free running 16-MHz oscillator and
related clock pulse generator. The basic 16-MHz is
counted down to form three 1-MHz clock outputs
(HBT1AOV, HBT1COV, and HBCK1O), a 2-MHz clock
output (HBCK20), and a 4-MHz clock output
(HBT4COV). These clock signals are present at all
times while equipment power is on. In addition, two 500-
kHz clocks (HBSOOOV and HBT5KQ) are provided by
a divide-by two counter, with the 1-MHz input (HBCK1O)
as the source. Both 500-kHz clocks are also present
during power on, and will be inverse from one another.
All remaining logic circuits in the clock and timing

function use these basic frequencies as the source
inputs.

        b.   *Timing and Control Logic.* This logic
consists of those functions that control, select, and
generate the primary timing signals used throughout the
MTS logic. The MTS test and control logic represents
circuits dedicated to external equipment used for factory
test only. The following associated signals will not affect
clock and timing logic operation: error (HBJAFO), states
two to six reset (HBRSAAV), pulldown (HBGN1OV),
start test reset (HBFBCAV), and 500-kHz clock
(HBTFEA). The clock control and select logic receives
two clock signals, 2-MHz (HBCK20) and 500-kHz
(HBT5KQ), and will select one or the other as output
(HBTFAO), dependent on control inputs 2-MHz enable
(HBWAIA) or 500-kHz enable (HBWAXOV). These two
control inputs will always be inverse from one another;
ie, if 2-MHz enable is high, 500-kHz enable will be low,
and vice-versa. The enables are a function of the card
ID code detected for the cut. In addition, a low self-test
disable input signal (HBCCTP) inhibits both clocks when
a self-test comparison operation is being performed.
Table 7-14 summarizes these relationships.
        c.   *Timing Generator Logic.* The timing
generator operates with the 500-kHz or 2-MHz input
(HBTFAO) to develop a series of time slots which
control most major elements of MTS operation. (See
figure 7-16.) The timing generator consists of shift
registers and decoding networks that develop a cycling
series of output signals dependent on the load
(HBSAIP), shift (HBSAIQ), and

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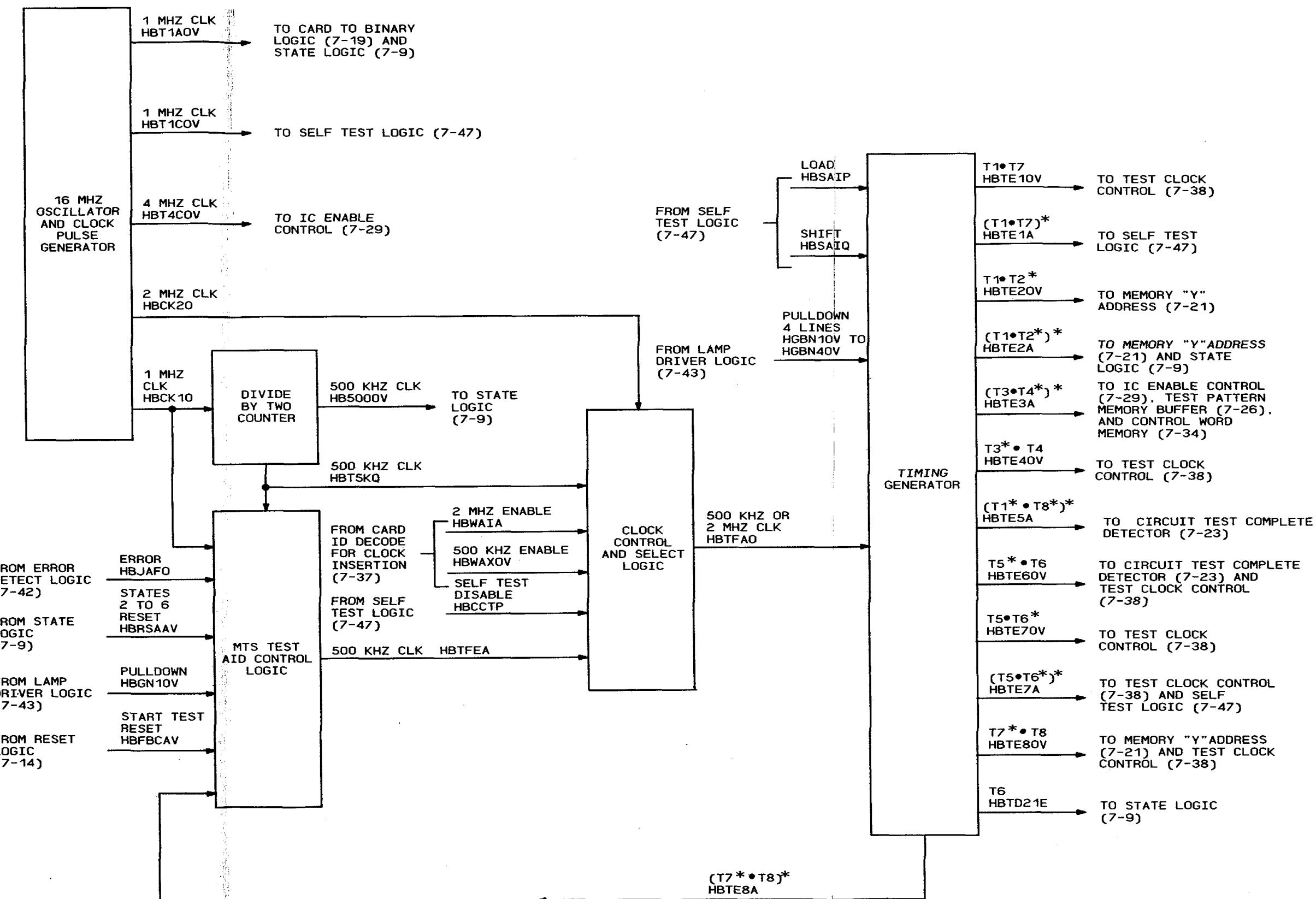
Figure 7-15. Clock and Timing Functional Block Diagram

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Table 7-14. Clock Select Truth Table

SELF-TEST DISABLE (HBCCTP)	Inputs 500-kHz ENABLE (HBWAXOV)	2-MHz ENABLE (HBWAIA)	Outputs 500-kHz OR 2-MHz (HBTFAO)
0	X	X	Always 1
1	0	1	2-MHz
0	1	0	500-MHz

X = IMMATERIAL

pulldown (HGBN1OV to HGBN40V) inputs. The load and shift inputs from the self-test logic will always be inverse. When the load input is high, the shift input will be low, and the shift registers will be preloaded with all zeros from the pulldown lines (HGBN 1 OV to HGBN40V). When the load input goes low and shift goes high, the timing generator starts a cycling and shifting action, thus developing the timed-sequence of outputs shown in figure 7-15 (HBTE1OV, HBTE1A, HBTE20V, HBTE2A, HBTE3A, HBTE40V, HBTE5A, HBTE60V, HBTE70V, HBTE7A, HBTE80V, HBTD21E, and HBTE8A). Time base signals T1 and T8 are intermediate signals developed within the timing generator and are used to derive the final outputs (shown for reference only in figure 7-16).

7-12. Test Probe Assembly (fig. 7-17). The test probe assembly consists of a 12-foot electrical cable with two 85-pin connectors (Pi and P2) on one end and a probe handle on the other. The probe handle houses apcb, a magnetic coil assembly, two indicators (GO/NO-GO), and a sacrificial connector which connects to the CUT. The pcb contains four latching relays, a line termination network, and a clock pullup network. The test probe assembly provides the interface between the MTS and CUT.

a. *Card ID Latch Function.* The card type latch function consists of four latching relays (K1 thru K4). The latching relays latch the active low card ID signals (HCO1AOT, HCO1BOT, HC40AOT and HC40BOT) to the analog ground connected to the relays. The probe + l5v (HC+ 15R1) line applies + 15v to the relay coils. Two other card ID signals, HC20AO1 and HCTP210, are not latched. The six card ID signals form a code to identify the CUT connected to J3.

b. *Magnetic Coil Functions.* The magnetic coil serves to actuate the reed relay located on the CUT. The close/open reed relay signals (HCNRGA and HCDNRGA) apply a ground signal to the magnetic coil. The coil + 15v line applies + 15v to the magnetic coil center tap. When energized, the magnetic coil develops a magnetic field, which causes the reed relay on the CUT either to open or close during the functional test procedures.

c. *GO/NO-GO Indicators.* The GO/NO-GO indicators located on the probe handle provide a local GO/NO-GO indication during continuity and functional test procedures. These indicators are energized by active-low GO and NO-GO HBJARD6 and HBJAPD6 signals, respectively, at the start of a continuity or functional test procedure. After the test procedure, only one indicator remains lighted to indicate the result of the applicable test procedure.

d. *Cable Termination Network.* The cable termination network consists of diodes, capacitors, and resistors which provide noise filtering and the proper line termination to the probe test data lines. Each data line consists of a twisted pair of wires, the signal line (HAPO1D thru HAP72D) and the signal return (HCG01 thru HCG72). The signal lines are connected to the line termination network, and the signal return lines are connected to the analog ground, both at the analog bay and probe handle.

e. *Clock Pullup Network.* The clock pullup network consists of three diodes and resistors connected in series to connect the clock pullup (HC6020) signal to three of the probe test data lines to the CUT, HAP34DT, HAP46DT, and HAPSODT. The HC6020 signal applies a pullup voltage (+ 5v) through the clock pullup network to the clock input lines on the CUT requiring clock signals.

f. *CUT Operating Voltage.* The CUT + 5V (HCPRB+51) line applies +5v to CUT during the test procedures. The dc return is applied by the analog ground line HCG73T.

7-13. Card ID Decoder Logic Detailed Description (fig. 7-18). Card ID decoder logic is located on pcbs in the left-hand card cage of the MTS. The gating logic produces the low true state output (HBB53A) in state one or state ten. The output is used to trigger a 1 sec delay, one-shot flip-flop in the special card test logic. The decoder logic produces the 6-bit card lD output (HBB210 to HBB260), depending on the inputs from the CUT through the probe, and special card test. Card ID outputs address memories in the card ID random-to-binary logic and self-test logic. Latches B and dual B

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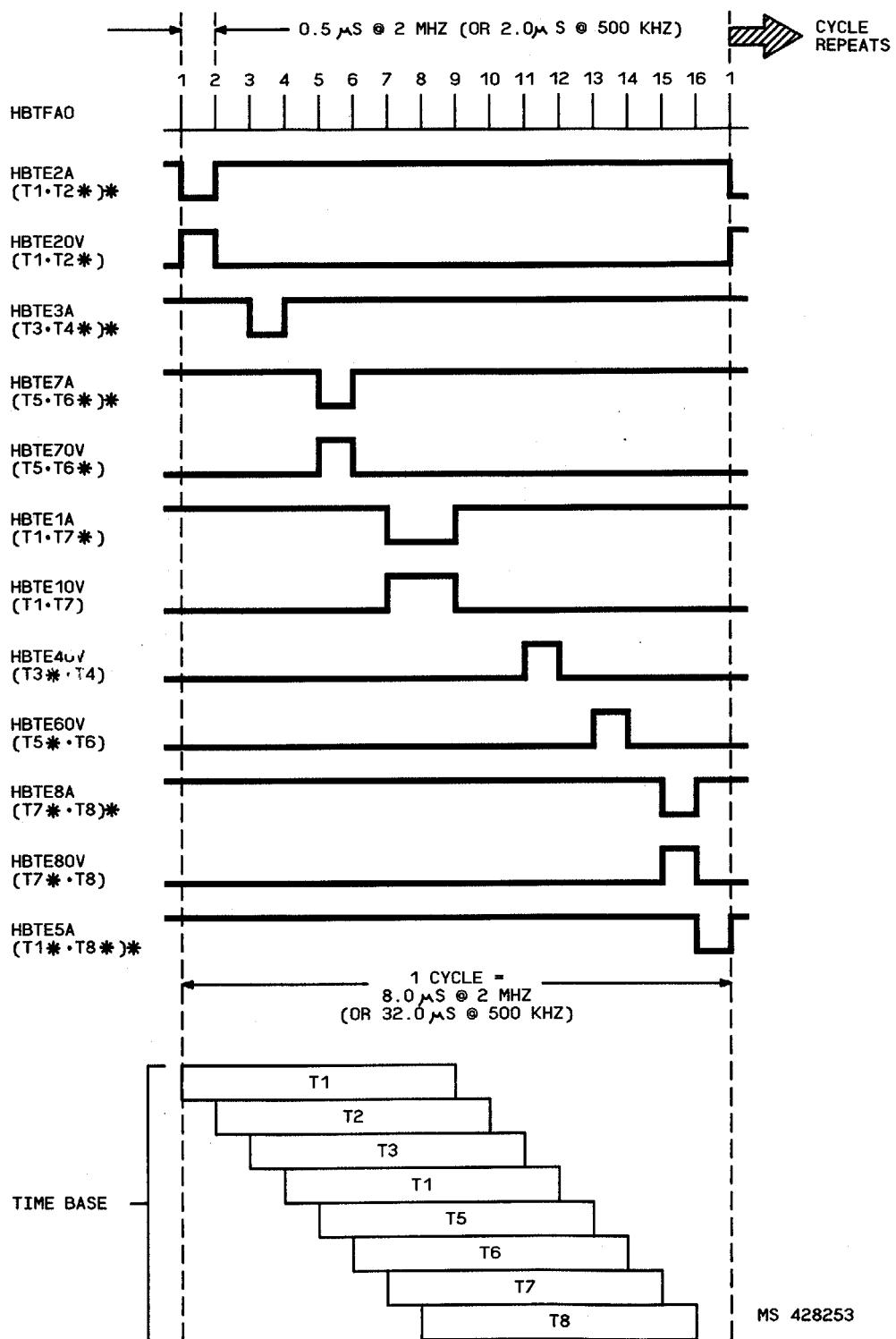
Figure 7-16. Timing Generator Timing Diagram
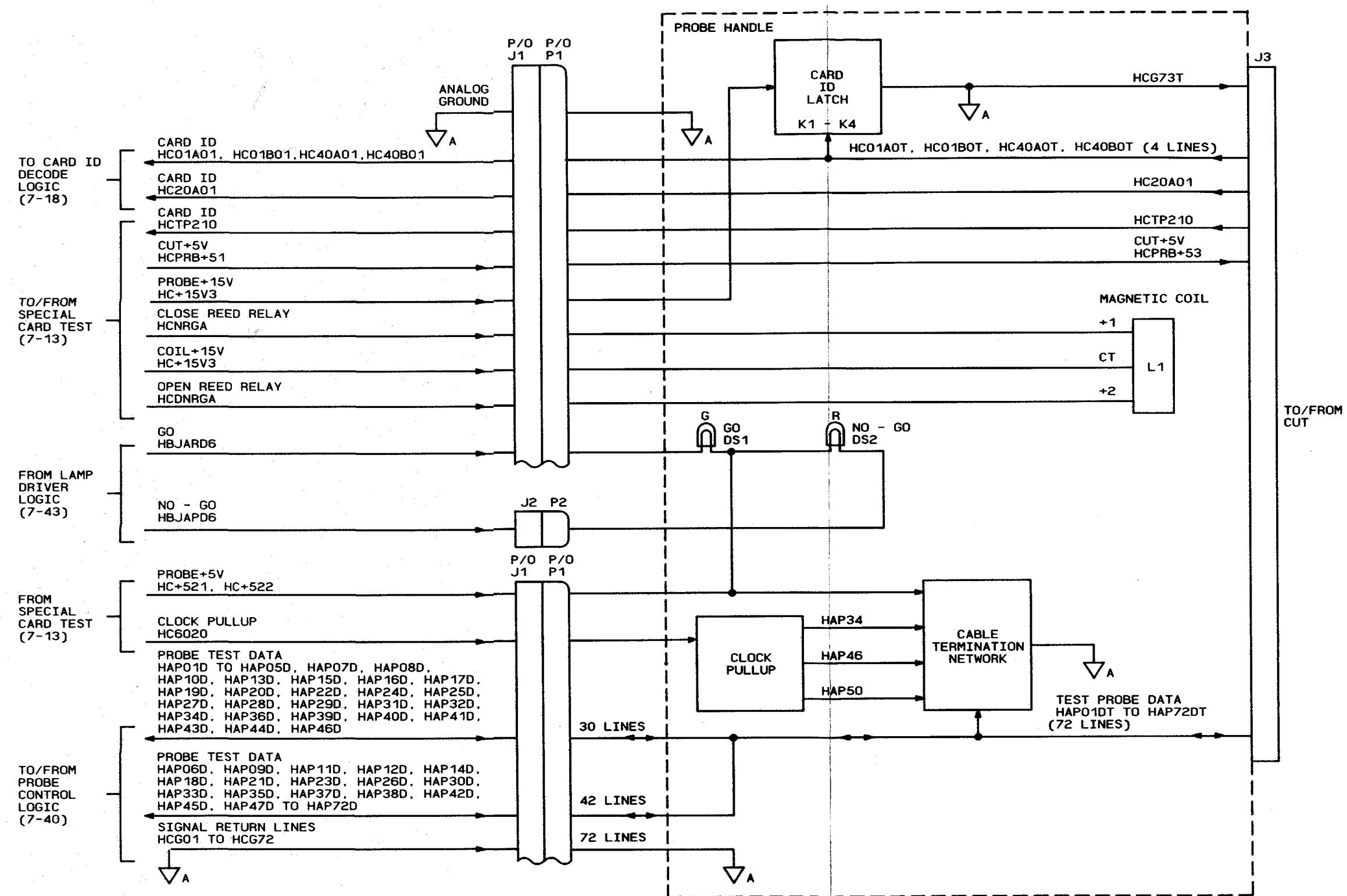
Figure 7-17. Test Probe Functional Block Diagram

MS 428270

7-169/(7-170 blank)
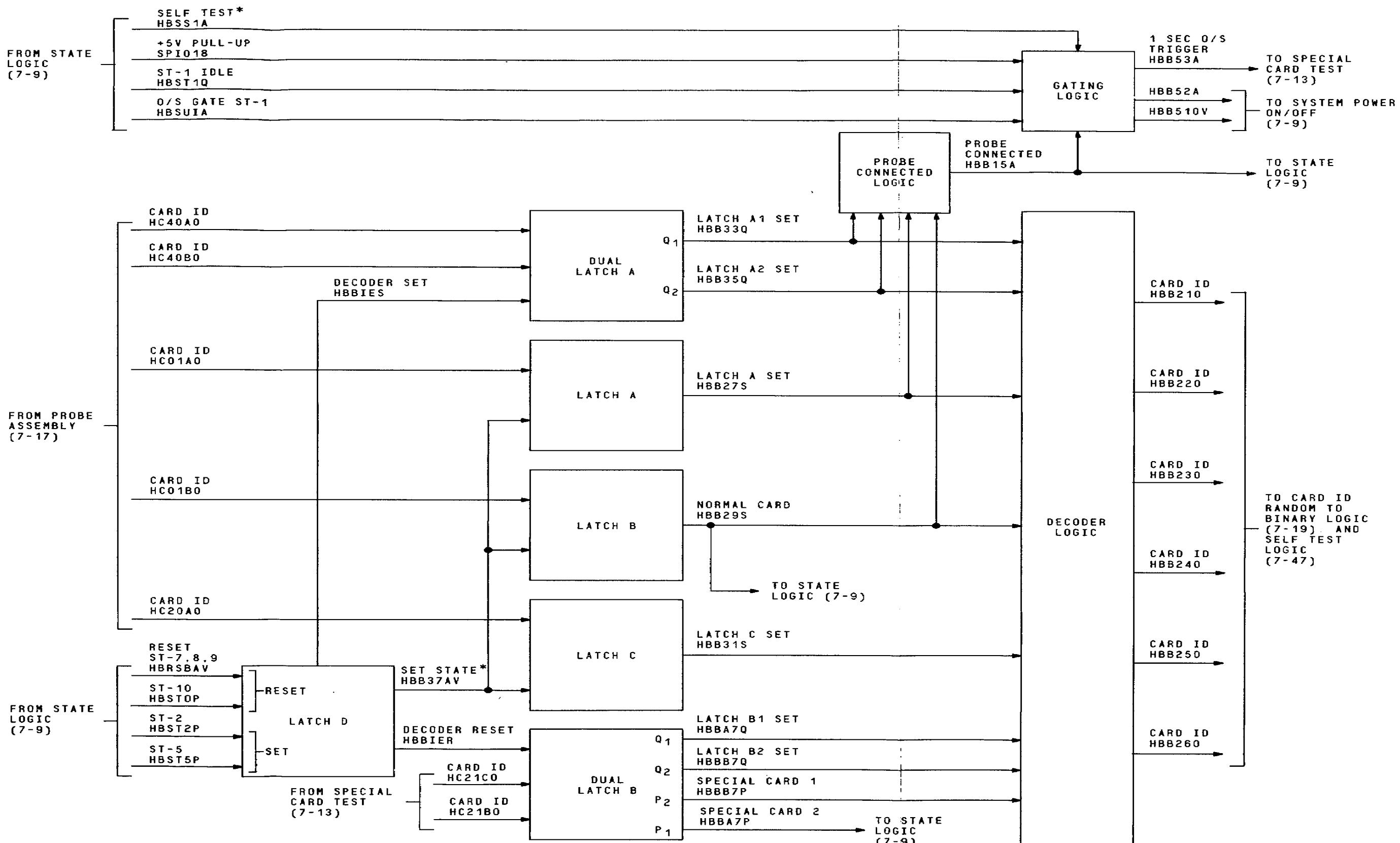
Figure 7-18. Card ID Decoder Block Diagram

MS 428237A

provide card signals (HBB29S and HBBA7P) to the state logic, depending on the card ID inputs (HCOIBO1, HC21CO, and HC21BO).

a. *Grating Logic.* The low HBB53A is produced in the gating logic, either by a low HBSB80 at state ten when HBB15A is high, or by a high HBST1Q and a high HBSU1A when HBB15A is low. The active low HBB53A is inhibited by self-test* (HBSS1A) when in self-test. HBB15A is low when the inputs to the probe connected logic (HBB33Q or HBB35Q) and (HBB27S or HBB29S) are low (probe connected). HBB37AV is latched high and HBBIES is latched low when HBRSBAV or HBSTOP sets latch D. With latch D set, HC40AO1 low resets dual latch A output (HBB33Q) to low, and/or HC40BO1 low resets output (HBB35Q) to low, and HC01AO1 low resets latch A output (HBB27S) to low, and/or HCOIBO1 low resets latch B output (HBB29S) to low.

b. *Decoder Logic (table 7-15).* Latch D must be set for the decoder to provide an output. Latch D resets the six decoder outputs to zero. Refer to the example in table 7-15. HC40AO 1, HC40BO 1, HC0 1 AO 1, and HC20AO1 are high. HC20BO, HC20CO, and HCOIBO1 are low. HC40AO1 and HC40BO1 high set dual latch A outputs (HBB33Q and HBB35Q) high, respectively. HCOIAO1 high sets latch A output HBB27S high and HC20AO1 high sets latch C output (HBB315) high. HC21BO and HC21CO low resets the dual latch B output (HBBA7Q) to low. HC21BO low also sets the output (HBBBB7Q) to high. The latched outputs are applied to the decoder logic. For example, the decoder logic produces the outputs HBB210 to HBB260, according to table 7-15, in the following manner:
*HBB37AV high and:
HCO1AO1 high produces HBB210 high
HC20AO1 high and HC21BO low produces HB13230 high
HC21BO and HC21CO low produces HBB240 high
HC40AO1 high produces HBB250 high
HC40BO1 high produces HBB260 high

HBB240 remains low because the conditions necessary to produce a high are not provided by any combination of these inputs. These six outputs are the random card ID code that is sent to the card ID random to binary logic.

7-14. Card ID Random-To-Binary Logic (fig. 7-19).
The card ID random-to-binary logic is located on pcbs located in the left-hand card cage of the MTS. The function of this logic is to provide a binary code (1) which corresponds to the type of pcb (cut) tested randomly, or (2) which is the fixed sequence output of a binary counter that, during self-test, simulates pcbs tested by the MTS.

a. *Card ID Random-to-Binary Code.* The CUT random card ID (HBB210 to HBB260) from the card ID decoder consists of a 6-bit code that addresses the ROM. When the ROM is enabled after a 1-see delay by the positive-going trailing edge of the probe connected delay signal (HBKC1Q), the 6-bit binary card ID code for the input address is output as (HBCID 1 V to HBCID6V) to the wired OR circuit and continues out as the output (HBCICiB1 to HBCI5B1). This output is used as the ROM address in several functions (see fig. 7-19). ROM outputs go high when disabled by the low HBKC1Q. The high ROM output (HBCID7V) enables the counter logic and the self-test start pulse generator. The erroneous card ID=L or output (HBCID8V) is a function of the ROM program when the ROM is enabled. The bit-5 card ID (HBCID4B1) is sent to the state logic.

b. *Self-Test ID Logic Fig 7-19 and 7-20).* The probe on delay (HBKC1Q from the state logic disables the ROM during self-test. When disabled. the ROM outputs are high allowing the wired OR outputs to be controlled by the self-test logic. HBCID7V high enables the logic output of the counter and is applied to the self-test start pulse generator. The state-7 input (HBST7P) high is inverted producing HBCTRAV low, which clears the pulse generator, counter and logic, and the counter clock latch and logic. HBCTRAV also goes to the reset logic. With HBCID7V high and HBCTRAV low, the 1-MHz clock input (HBT1AOV) produces the active low start pulse (HBCSSA) which sets the latch and logic. The card test complete (HAFTBQ) from the IC enable control is low at this time and the latch set produces no counter clock (HBCSC0). The cleared output of 000000 is sent to the wired OR tie points. The end-of-test=L (HBCASA) signal B sent to the reset logic.

(1) The self-test off output (HBCRIP) of the self-test start pulse generator goes low at the 1-MHz clock after HBCID7V goes high, and stays low during self-test. This output goes to the error detection logic. The second 1-MHz clock after HBCID7V goes high, causing self-test SP signal (HBCR2Q) to go high and self-test* signal (HBCR2P) to go low. HBCR2Q goes to the self-test error logic and HBCR2P goes to the state logic. The trailing edge of HBCSSA coincides with the low HBCR2P.

(2) The MTS cycles through the test function and, at the completion of the card test for 000000, HAFTBQ goes high. HAFTBQ high and the latch set produces the counter clock (HBCSCO). The clock advances the counter output to 00001, and the logic enabled by HCID7V provides the binary code to the OR circuit. The counter and logic output is also sent to the NAND gate decoder. When the count is 29=011101, the NAND gate outputs the low 29 count gate (HBCTSA3 to the state logic and to the self-test complete latch. HBCTSA sets the latch. The output (HBCSTD6) to the lamp driver logic is latched and inverted to an active low.

(3) When an error occurs, the test error input (HBJAGAV) from the error detect logic resets the counter clock latch and logic. With the latch reset, HAFTBQ does not provide a counter clock and the test loops on the faulty card. To stop the looping, SELF

Table 7-15. Card ID Decoder Truth Table

7-bit coded card ID input								Random 6-bit decoded output					
HBB37AV*	HC40B01	HC40A01	HC21C0	HC21B0	HC20A01	HC01B01	HC01A01	HBB210	HBB220	HBB230	HBB240	HBB250	HBB260
1	X	X	X	X	X	X	1	1	X	X	X	X	X
1	X	X	X	1	1	X	X	1	X	X	X	X	X
1	X	X	X	1	1	X	X	X	1	X	X	X	X
1	X	X	X	X	X	1	X	X	1	X	X	X	X
1	X	X	X	0	1	X	X	X	X	1	X	X	X
1	X	1	X	1	1	X	X	X	X	1	X	X	X
1	X	X	X	1	0	X	X	X	X	1	X	X	X
1	X	X	0	0	X	X	X	X	X	X	1	X	X
1	X	X	X	X	1	1	X	X	X	X	1	X	X
1	1	X	X	1	1	X	X	X	X	X	1	X	X
1	X	1	X	X	X	X	X	X	X	X	X	1	X
1	X	X	X	1	0	X	X	X	X	X	X	1	X
1	1	X	X	X	X	X	X	X	X	X	X	X	1
1	X	X	X	1	0	X	X	X	X	X	X	X	1
0	X	X	X	X	X	X	X	0	0	0	0	0	0

EXAMPLE   1 1 1 0 0 1 0 1 = 1 0 1 1 1 1

0 = LOW, 1 = HIGH
X = IRRELEVANT
*HBB37AV (HIGH) = HBBIER (HIGH) = HBBIES (LOW) = HBRSBAV (LOW) OR HBSTOP (LOW)
*HBB37AV (LOW) = HBBIER (LOW) = HBBIES (HIGH) = HBST2P (LOW) OR HBST5P (LOW)
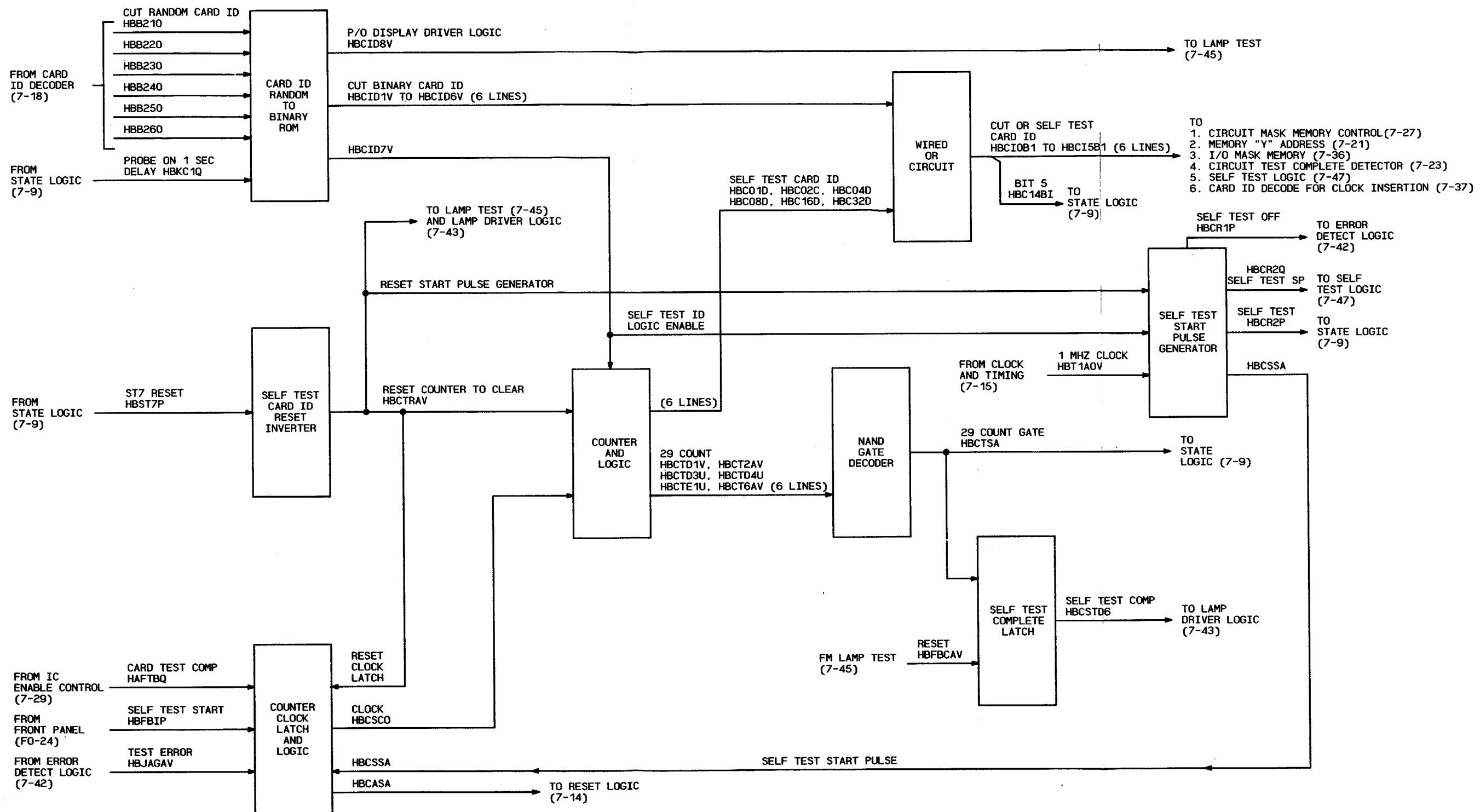
Figure 7-19. Card ID Random-to-Binary Block Diagram

7-175(7-176 blank)

MS428238

PART A

STATE 7 RESET
HBST7P
(SEE PART B)

29 COUNT GATE
HBCTSA

SELF TEST COMP
HBCSTD6

SELF TEST ID LOGIC
ENABLE
HBCID7V

PART B

000000 CARD TEST ————————— 000001 CARD TEST

HBST7P
(SEE PART A)   PERIOD VARIES WITH IC/CARD

COUNTER RESET
HBCTRAV

1 MHZ CLOCK
HBT1AOV   1CP   1µS

PULSE GENERATOR
(INTERNAL)
HBCR1Q

PULSE GENERATOR
(INTERNAL)
HBCR2P

SELF TEST START PULSE
HBCSSA

IC COUNT   RESET AT
EQUALS NO OFIC   START OF NEXT CARD

CARD TEST COMPLETE
HAFTBQ

CLOCK LATCH (INTERNAL)
HBCSMI

COUNTER CLOCK
HBCSCO

COUNTER OUTPUT (BINARY
COUNT=ONE) (INTERNAL)
HBCTD1U

SELF TEST (BINARY
COUNT=ONE)
HBCO1D

MS 428239

Figure 7-20. Self-Test Card ID Timing Diagram

7-177

TEST must be selected on the front panel. Self-test selection sends the self-test start signal (HBFBIP) from the front panel to the counter clock latch and logic. HBFBIP sets the latch and the self-test of cards cycles to completion.

7-15. Memory Y-Address (fig. 7-21). Memory Yaddress logic is located on pcbs in the left-hand card cage. The function of this logic is to provide the control word memory and the test pattern memory with the address to select the test patterns for each circuit of each IC on the CUT. For example, the Y-address counter steps through the four test patterns that are necessary to test the four possible combinations of inputs to a two-input NAND gate. The logic decoder output provides part of the initial count of the counter in the test clock control. The binary card ID (HBCIOBI to HBCI5BI) addresses the Yaddress ROM. The initial count (HBMYIV1 to HBMY6V1) for the Y-address counter corresponds to the card ID. The ROM is enabled by the. high function-test enable (HBRM30V). Reset (HBFBCAV) clears the counter after all tests are complete. ST-7 (HBST7Q) low resets the counter control latch. (See figure 7-22.) When HBRM30V goes high, the low counter control load output (HBMYLA) loads the Y-address counter with the initial count. The (T1T2*)* input from the clock and timing terminates the load gate. When the clock-in-progress (HBLAKP) input from the test clock control is high and the T7*T8 (HBTE80V) pulse from the clock and timing occurs, the counter control clock output (HBYCPO) advances the Y-address counter one step. When low, the test clock in progress (HBLAKP) inhibits the clock output. The Y-address counter outputs (HBMYBIU to HBMYB4U and HBMYCIU and HBMYC2U) are sent to the drivers, decoders, and the circuit test complete detector. The detector compares the Y-address output to a value which corresponds to the card ID and sends back to the memory Y-address the circuit test complete signal (HBHAIA) which resets the Y-address counter. While reset, the counter control loads the Y-address counter with the initial count again and generates the CKT CTR CLK (HBYBPOV) for the circuit mask memory control when the T1T2* (HBTE20V) pulse occurs. The drivers send the Y-address signals (HBYA10V to HBYA60V and HBYB10V to HBYB60V) to the control word memory and the Y-address (HBMY1AV to HBMY6AV) to the test pattern memory through the lamp test logic. The decoder provides a low test clock initial count output (HBMXWA) to the test clock control under the following conditions:

HBCCRAV, always low
HBK080V, high
HBMYB1U, low
HBMYB2U, low
HBMYB3U, high
HBMYB4U, high
HBMYC1U, high
HBMYC2U, low

7-16. Circuit Teat Complete Detector (fig. 7-23). Circuit test complete detector logic is located on pebs in the left-hand card cage of the MTS. The function of this logic is to generate a variable Y-address stop location, dependent on the card ID, and to generate circuit test complete signals when the actual memory Y-address matches the stop Y-address. These functions operate partly under control of eloek and timing signals.

a. Y-Address Stop Location. A six-bit code (HBCIOB1 to HBCISBI) is received from the card to binary logic function and is applied to the Y-address stop location ROM. The six-bit code input forms an address to the ROM and represents the binary-coded card ID related to the type of pcb under test. When the ROM is enabled (HBRM10V) by the self-test logic, the six bit address input to the ROM generates a unique six-bit output word (HBHBllV1 to HBHB16V1). This word represents the Y-address stop location and is supplied as one set of inputs to the comparator and decoder logic. The second set of inputs to the comparator and decoder logic is also a six-bit code for the Y-address (HBMYBIU to HBMYB4U, HBMYC1U, and HBMYC2U) that originates in the memory "Y" address function. A comparison is performed between the actual memory Y-address versus the Y-address stop location from the ROM. When an exact match occurs between these two sets of binary codes, the first group of input conditions to the decoder circuit is satisfied. This point in time represents the condition where the memory "Y" address is to be inhibited from incrementing further, and is subject from here on only to clock and timing control.

b. Timing Control for Circuit Test Complete fig 7-24). Once the comparator detects a match, the following events occur. The decoder logic is enabled after a match by two additional signals: test complete pulse (HBTE60V) and full clock pulse count (HBLAFO). The full clock pulse count signifies that the last clock pulse required for a functional test pattern has occurred. When the test complete pulse is received at time T5*T6 (HBTE60V), the last condition to satisfy the decoder is met, and a set latch * signal (HBHAGA) is generated. See figure 7-23. The first (HBHAHS) of three circuit test complete signals is then provided from the latch and gating logic, as the cross-coupled NAND gate latch sets on the trailing edge of the set latch * signal (HBHAGA). The next two circuit test complete signals (HBHAIA and HBHIOV) are generated at time T7*T8 (HBTE80V) after the latch is set. The entire operation concludes when the trailing edge of test comparator latch RST (HBTE5A) occurs to reset the latch circuit.

7-17. Test Pattern Memory (fig. 7-25). The test pattern memory is located on pcbs, which are located in the analog card cage. The test pattern memory stores the test pattern data used in diagnostic procedures by the probe control logic. Eight ROM pcbs in card locations 3120 thru 3127 provide up to 4K storage locations for the test pattern data words.

a. The 6-bit ROM Y-address (HCADOOHCAD50) signals address the desired ROM locations.
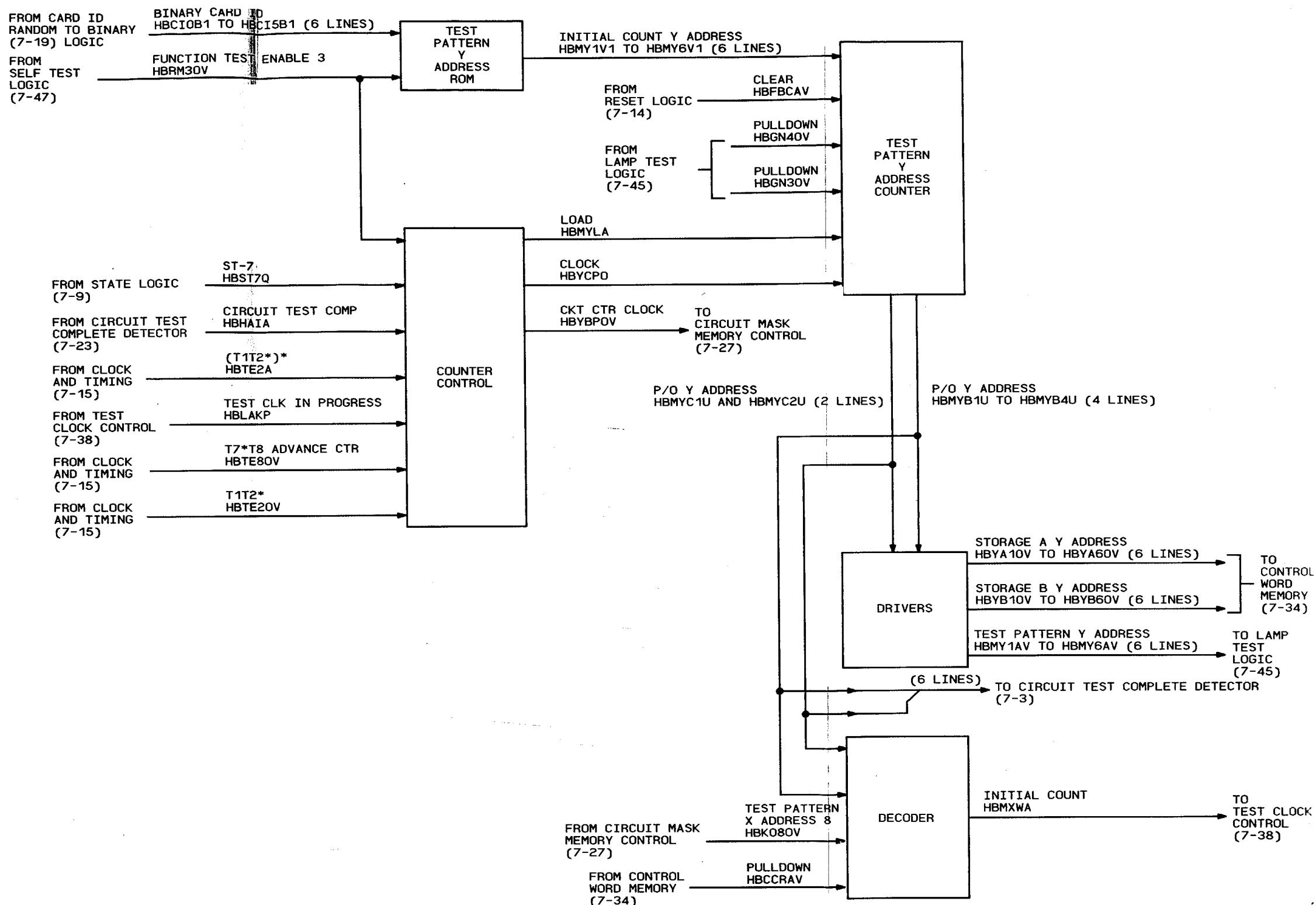
Figure 7-21. Memory Y-Address Block Diagram

7-179/(7-180 blank)

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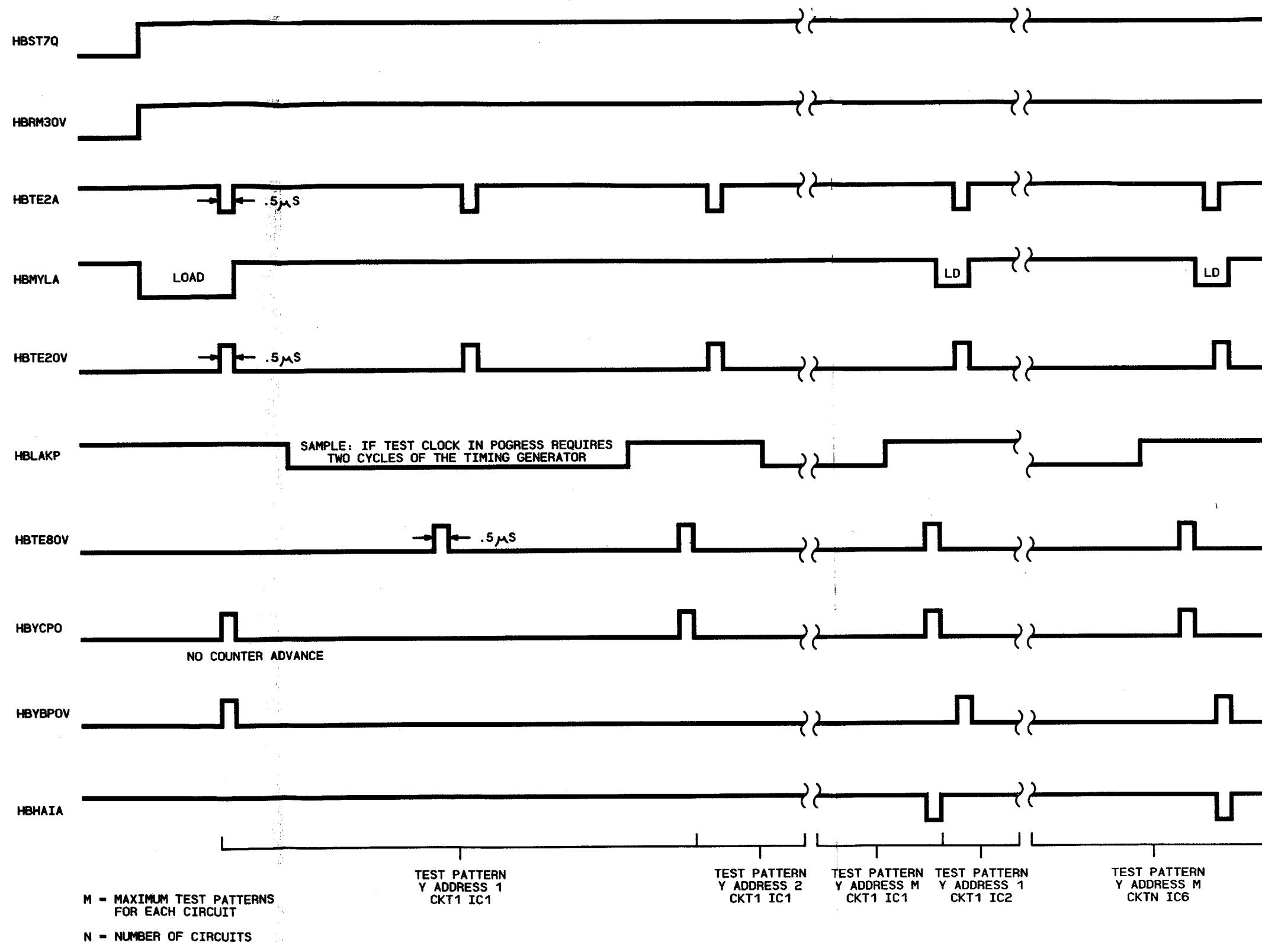
Figure 7-22. Memory Y-Address Counter Control Timing Diagram
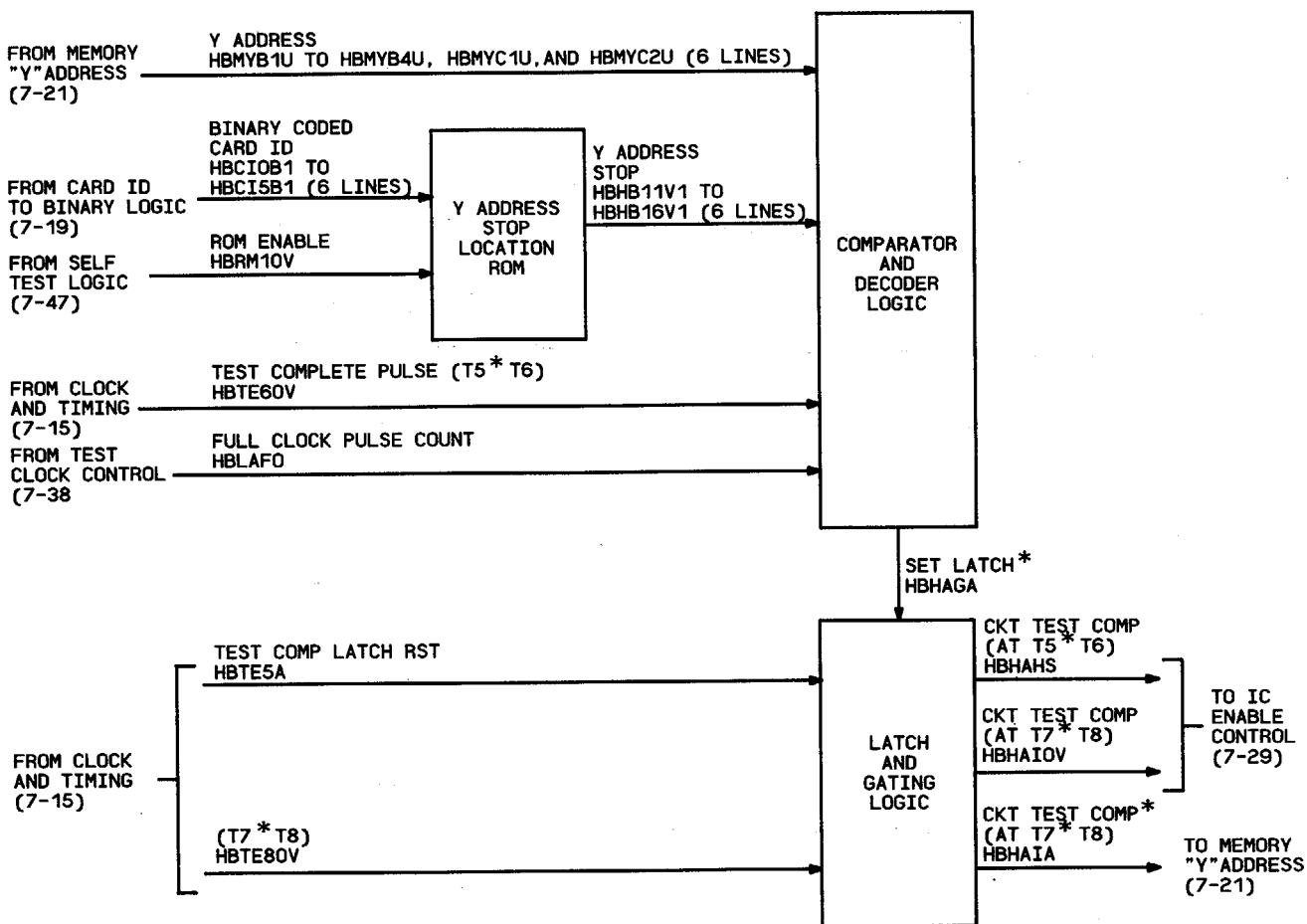
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Figure 7-23. Circuit Test Complete Detector Block Diagram

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7-183
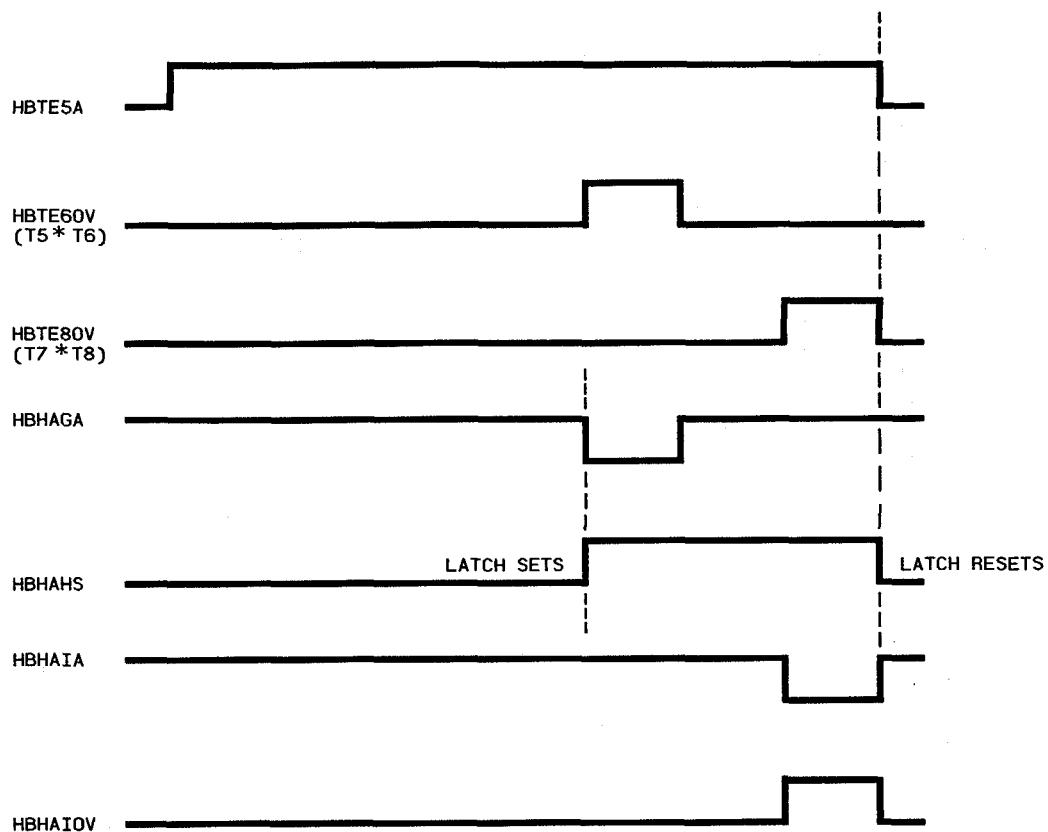
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Figure 7-24. Circuit Test Complete Detector Timing Diagram

7-184

MS 428255
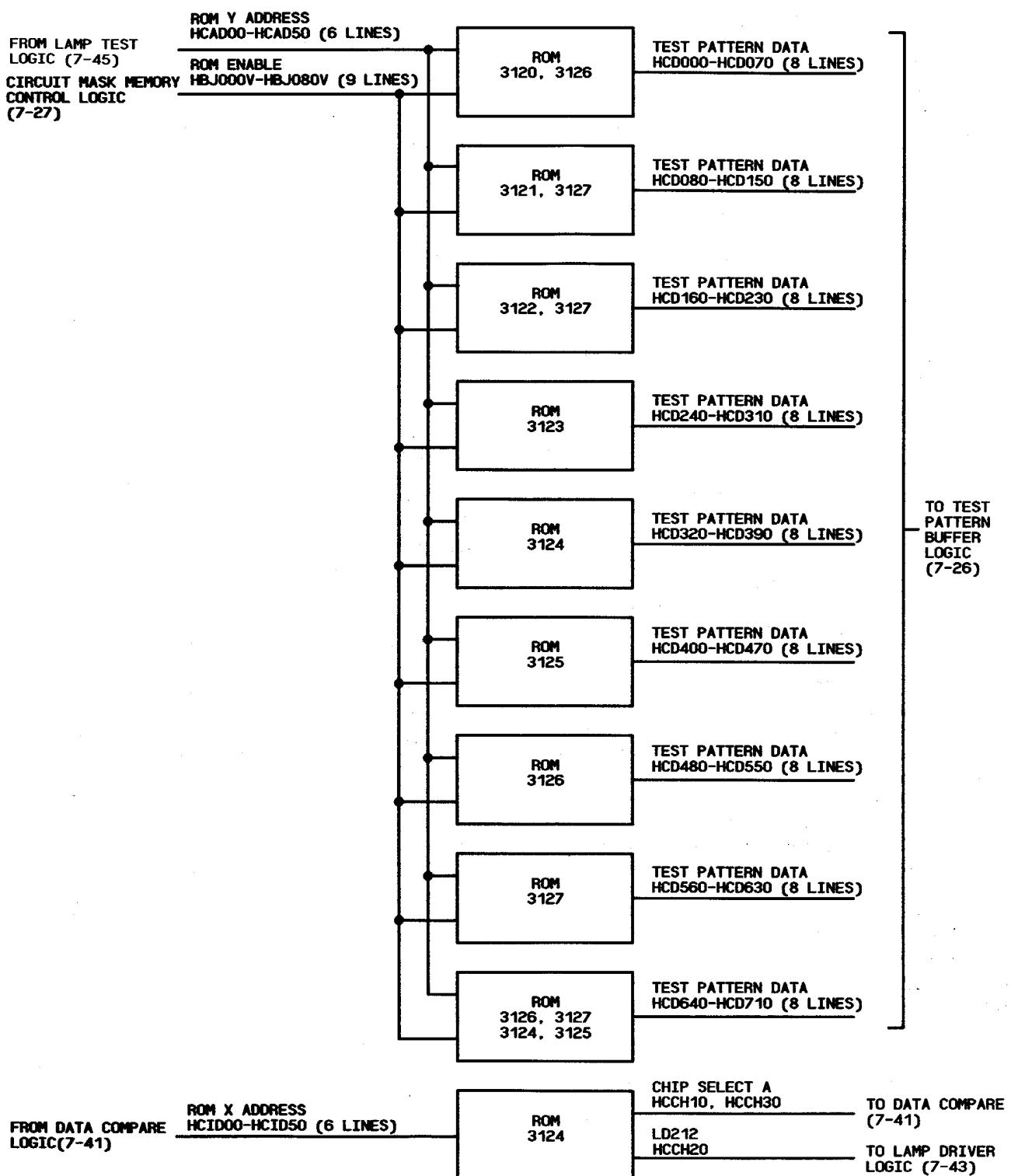
Figure 7-25. Test Pattern Memory Block Diagram

Nine ROM enable (HBJ00OV thru HBJ08OV) signals are used to enable the addressed ROM locations. A high ROM enable signal enables the selected ROM. A low ROM enable signal forces the ROM outputs to their open collector state. The test pattern data is output in variable word lengths in accordance with the CUT.

b. A separate ROM IC stores three chip enable signals (HCCHlO thru HCCH30). The HCCH1O and HCCH30 signals are used to enable the data compare circuits. The HCCH20 is used to set data latch circuits in the lamp driver logic. The ROM X address (HCID0O thru HCID50) signals address the ROM location. When high, the ROM enable signal enables the output of the addressed location.

7-18. Test Pattern Buffer Logic (fig. 7-26). The test pattern buffer logic is located in pubs, which are located in the right-hand card cage. This logic provides buffering for test pattern signals used during functional test by the probe control logic. The 72 test pattern data (HCD00O thru HCD71O) signals are loaded into four-bit shift registers by the load 72 clock (HBTE3A) signal. The HBTE3A signal is active approximately 1.5 µs after the functional test is initiated. The shift registers are configured as parallel in-parallel out data registers by pullup signals on the load (LD) and serial data (DS), and a pulldown signal on the shift (SH) inputs on the shift registers. The test pattern buffer outputs (HAD010E thru HAD183E) are applied to the probe control logic.

7-19. Circuit Mask Memory Control (fig. 7-27). The circuit mask memory control logic is located on pcbs in the left-and right-hand card cages. The test pattern X address logic is located in the left-hand card cage and mask memory address and decode logic is located in the right-hand card cage. The function of the test pattern X address logic is to provide an address to the test pattern memory which corresponds to the binary card ID input and to provide the number of circuits per IC to the IC enable control. The function of the mask memory address logic is to provide an address to the mask memory which corresponds to each type of circuit within the ICs mounted on the CUT. The function of the mask memory decoder and logic is to provide control strobes to the mask memory control to indicate the number of ICs on the CUT or to indicate a CUT with a single circuit.

a. *Test Pattern Address Logic.* The test pattern ROM is addressed by the card ID (HBCIOB1 to HBCI5B1). The ROM is enabled by the high function test enable 1 (HBRM1OV). The ROM outputs (HBKB14V to HBKB14V) are preprogrammed X address codes which correspond to the card ID. The address codes are sent to the decoder, which responds to the address code input by generating a strobe on the line (HBKA10T to HBKA18T) that corresponds to the coded input. Each of the nine strobes is paralleled out through a pair of drivers which form the control word X address

output (HBK00OV to HBK08OV) and the test pattern X address output (HBJ00OV to HBJ08OV). The ROM outputs (HBKB15V1 to HBKB18V1) indicate the circuits per IC to the IC enable control.

b. *Mask Memory Address Logic Dig. 7-28).* The circuit mask address ROM is addressed-by the card ID (HBCI0BI to HBCISB1). The output (HACMC1V to HACMC6V) which corresponds to the card ID input is the initial count for the IC circuit counter when loaded by the low IC CKT CTR enable input (HAENAS). HAENAS goes low at function test reset and high at T3T4* of the clock and timing logic. The count is output as the IC circuit count (HAACMIU to HAACM4U to HAACN I U and HAACN2U) to the drivers. The drivers send these signals to the mask memory control as the mask memory address (HAAM1OV to HAAM60V). The initial IC circuit count is the address to the circuit mask memory for the first circuit of the ICs to be tested. At T7*T8, test of IC number one and circuit number one is complete and HAENIOV goes low. When circuit one of all the ICs on the CUT hav been tested and if the ICs contain two or more circuits, the IC counter of the IC enable control is recycled to the initial count and HAEN1OV goes high. The IC circuit counter clock (HBYBPOV) goes high at T1T2* of the clock and timing logic. When HBYBPOV and HAEN1OV are both high, the high clock output (HACMAV) of the clock gating steps the IC circuit counter to the next count.

c. *Mask Memory Decoder and Logic.* The coded input to the mask memory decoder and logic consists of outputs (HACMC7V and HACMC8V) of the circuit mask ROM, which corresponds to the card ID and function test enable 2 (HARM20V) from self-test, which enables the decoder during functional test. When HACMC7V is high and HACMC8V is low, the output is any 6 IC card (HA6CCO). HACMC8V high and HACMC7V low provides a 5 IC card output (HA5CCO) and both high provides the single circuit card outputs (HACWAA, HACWAOV, HA1CCOV, and HAMGC3T). HA1CCAV is the inversion of HA1CCOV. HAECMOV enables the circuit mask memory. The decoder outputs HAECMOV, HA6CCO, HASCCO, and HA1CCAV go to the mask memory control. HA1CCOV goes to the IC enable control. HACWAA goes to the state logic.

7-20. IC Enable Control Detailed Description (fig. 7-29). IC enable control logic is located in the right-hand card cage with the exception of inverter 1141, which is located in the left-hand card cage. The function of this logic is (1) to provide a gate which corresponds to the number of the IC being tested to the mask memory control and (2) to provide functional test complete pulses when all functional tests for the CUT have been completed to the self-test logic and to the card ID random-to-binary logic.

a. *IC Gate Logic.* The low reset signal (HBFBAAV) from the reset logic resets the IC counter control. (See figure 7-30). When reset, the outputs of the IC counter control IC CKT CTR enable (HAENAS)
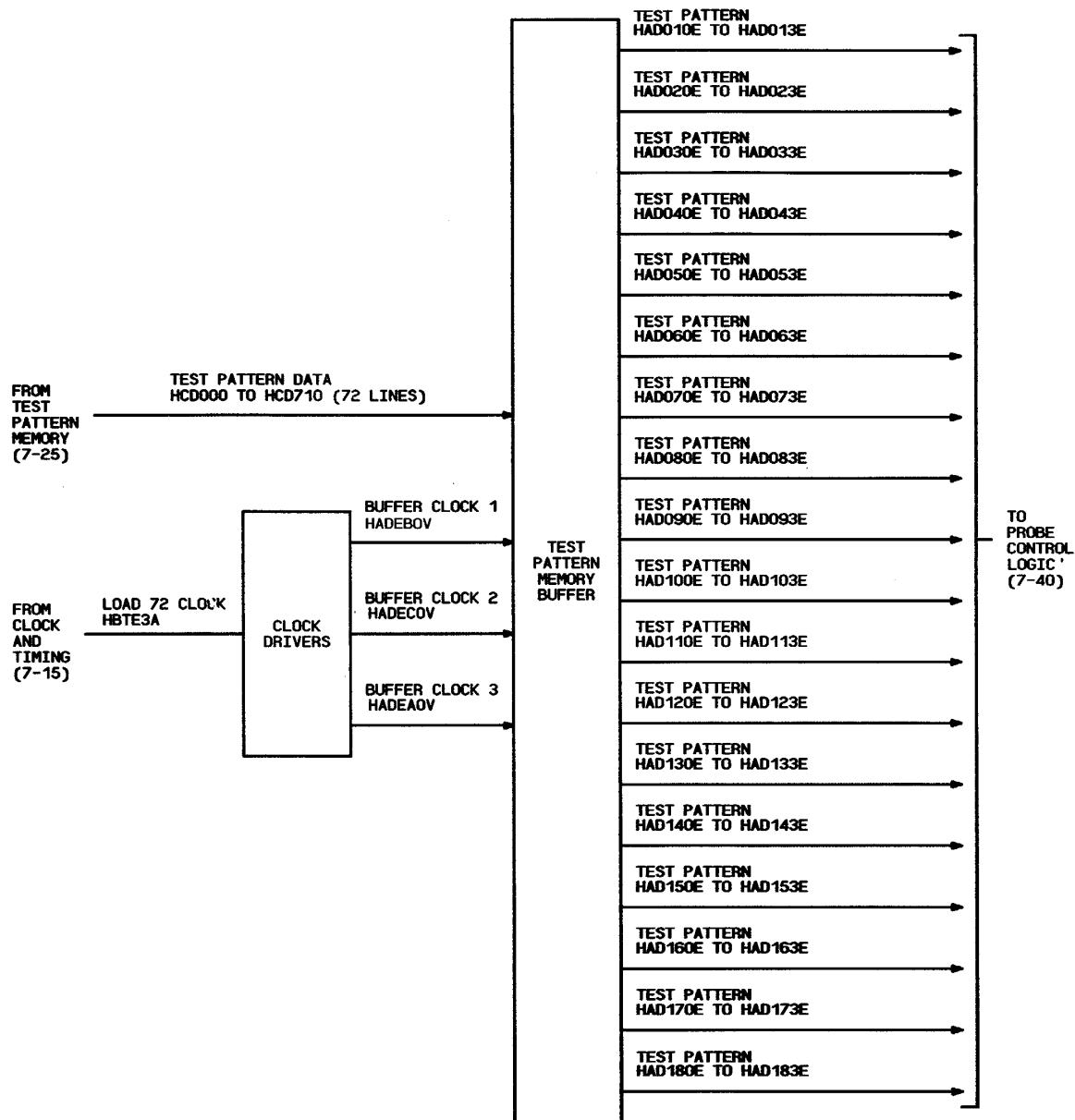
Figure 7-26. Test Pattern Buffer Block Diagram

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7-187/7-188(blank)
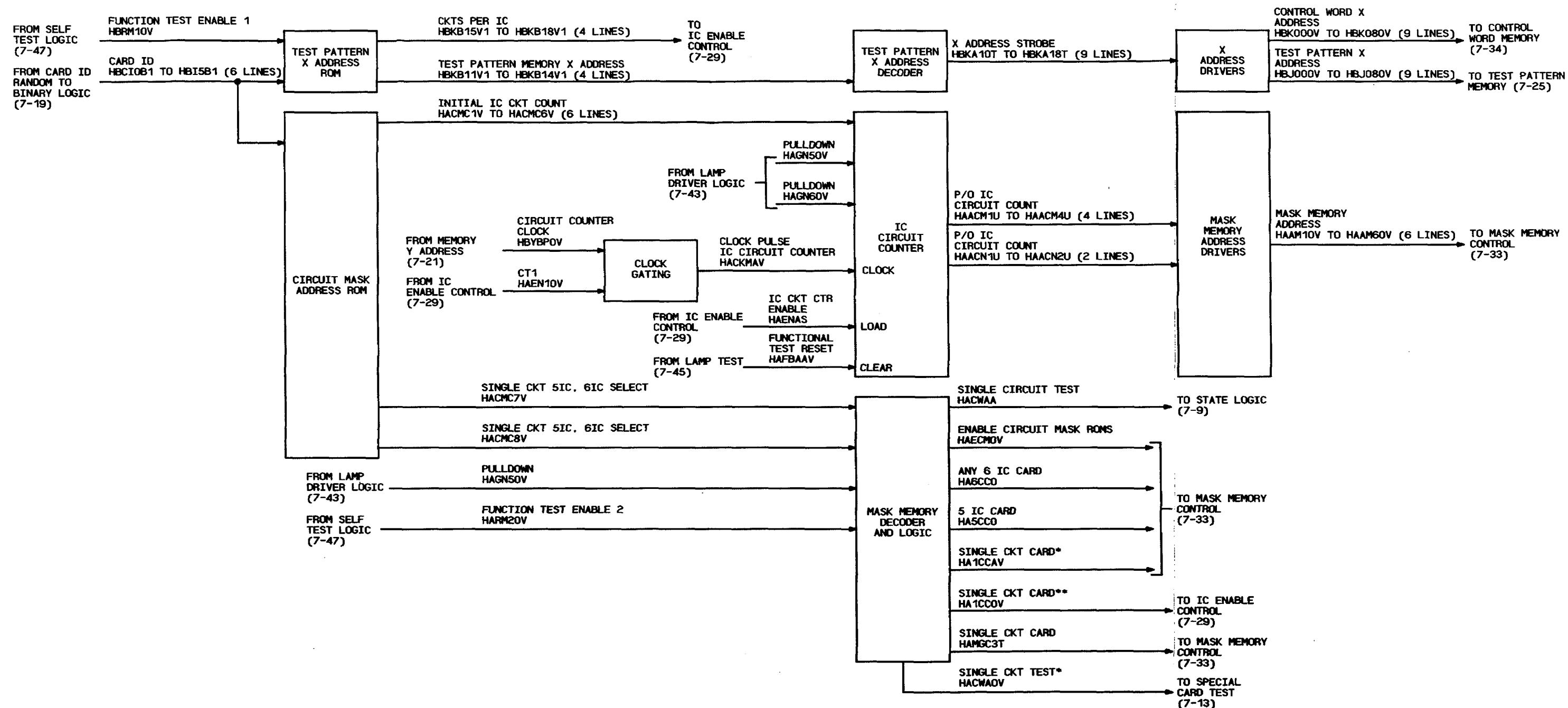
Figure 7-27. Circuit Mask Memory Block Diagram

7-189/(7-190 blank)

MS 428240
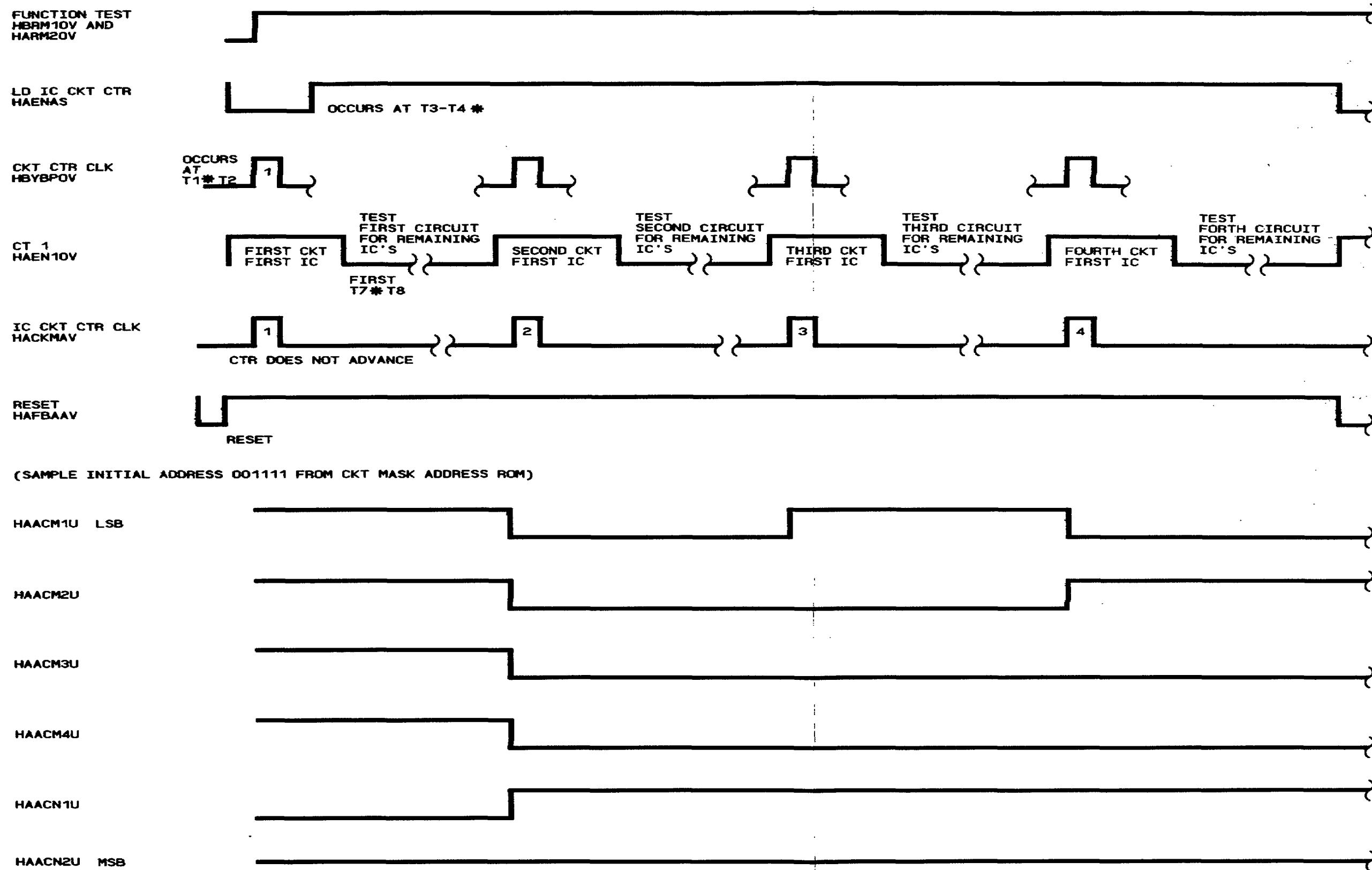
Figure 7-28. IC Circuit Counter Timing Diagram

7-191/(7-192 blank)
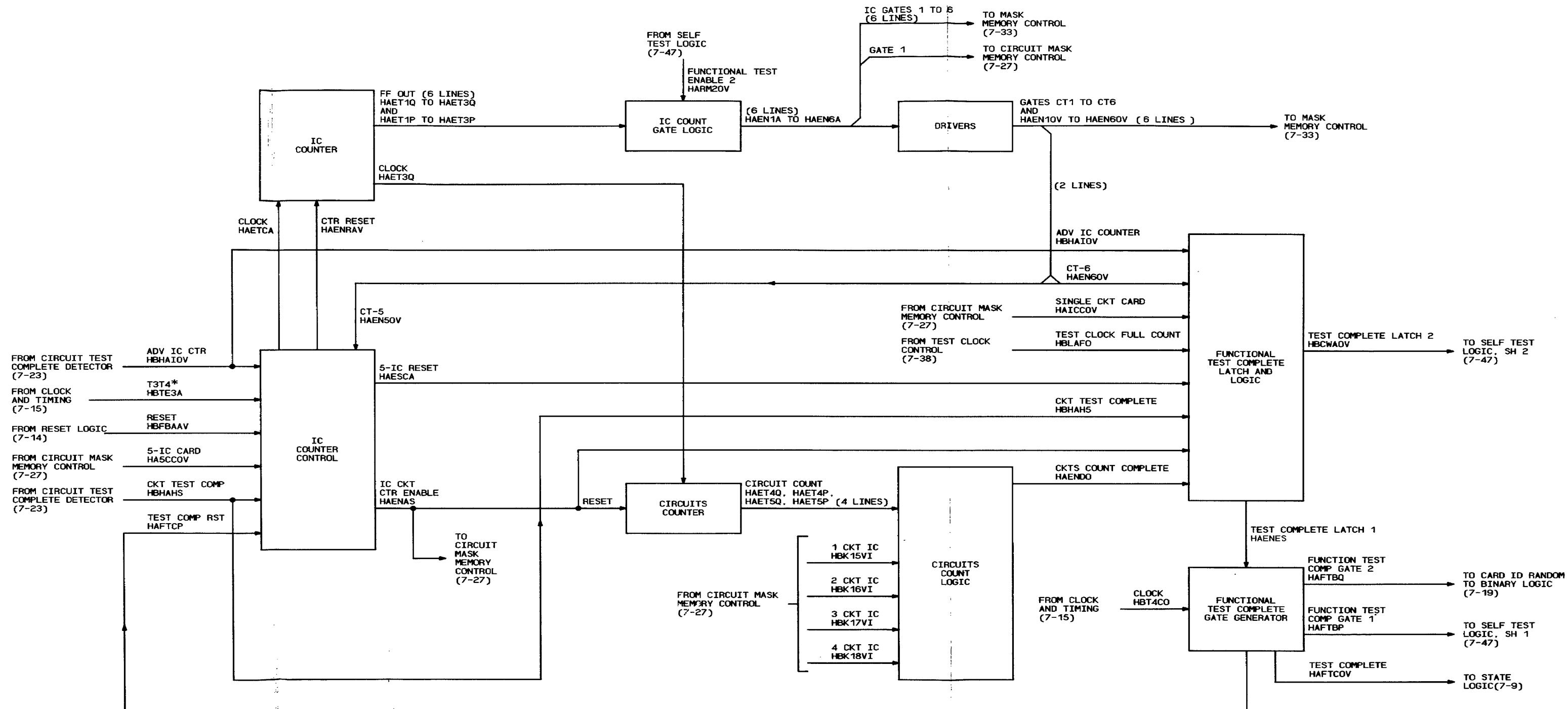
MS 428241

Figure 7-29. IC Enable Control Black Diagram

MS 428244

7-193/(7-194 blank)
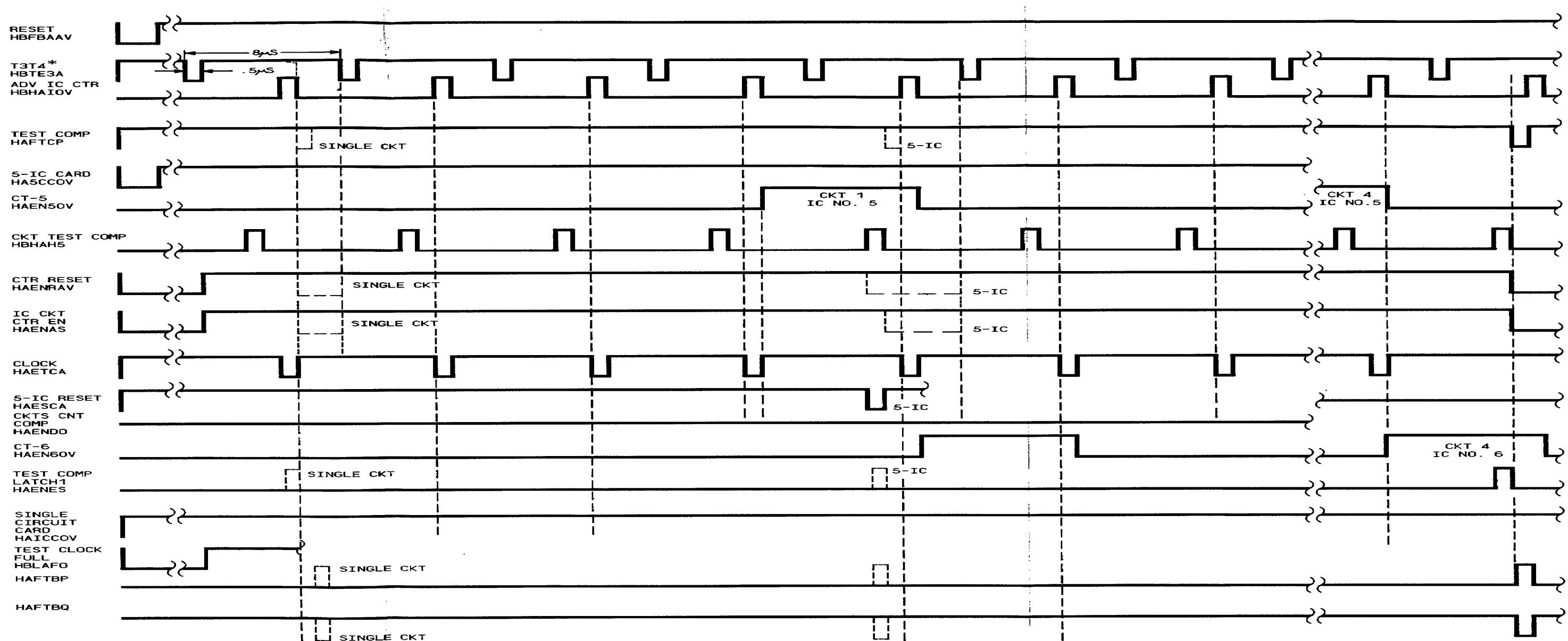
Figure 7-30. IC Counter Control Timing Diagram

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7-195/(7-196 blank)

and CTR reset (HAENRAV) are low. HAENRAV low resets the IC counter to the gate one state. The low T3T4* signal (HBTE3A) from the clock and timing logic sets HAENAS and HAENRAV to high. The ADV IC CTR signal (HBHAIOV) from the circuit test complete detector when high indicates all test patterns for the circuit have been completed. HAENAS and HBHAIOV high produce the low clock output (HAETCA) from the control. HAENAS is sent to the circuit mask memory control, circuit counter, and functional test complete latch and logic. HAETCA and HAENRAV are sent to the IC counter. HAETCA steps the counter to the gate two state. The count continues to the gate six state from which the counter recycles to the gate one state. When the CUT is a 5-IC card, the 5-IC card signal (HA5CCOV) from the circuit mask memory control to the IC counter control is high. HA5CCOV, HAEN50V, and HBHAHS produce the low 5-IC reset (HAESCA) and forces HAENRAV low. HAENRAV resets the IC counter at test completion during gate CT-5. This cycle continues until the functional test is complete. The outputs of the counters (HAET1Q to HAET3Q and HAETIP to HAET3P) are sent to the IC count gate logic. HAET3Q is also sent to the circuits counter. The outputs combine in the gate logic to produce IC gates one to six. (See figure 7-31.) The functional test enable input (HARM20V) enables gate one which is sent to the circuit mask memory control to step the IC circuit counter. Gates one to six (HAENIA to HAEN6A) are sent to the mask memory control and to the drivers. The driver outputs (HAEN10V to HAEN60V) correspond to-the inputs and are sent to the mask memory control. HAEN60V is sent to the functional test complete latch and logic and HAENSOV is sent to the IC counter control.

    b. Function Test Complete Logic. HAENAS resets the circuits counter. HAET3Q steps the counter to the second circuit as circuit number one is completed. (See figure 7-32.) The count continues to circuit n (n = number of circuits). The outputs of the counter (HAET4Q, HAET5Q, HAET4P, and HAET5P) are sent to circuit's count logic. The actual number of circuits is represented by the inputs (HBKISVI to HBK18VI) from the circuit mask memory control. In the example in figure 7-32, HBK18VI is high. This high and the combination of high inputs HAET5Q and HAET4P produce the CKTS count complete gate (HAENDO). HAENDO is sent to the functional test complete latch and logic. The high inputs (HAENDO, HAEN60V) and the CKT test complete signal (HBHAHS) from the circuit test complete detector to the functional test complete latch and logic produce the high test complete latch 1 (HAENES). (See figure 7-30.) Test complete latch 2 (HBCWAOV) occurs simultaneously with HAENES. When the CUT is a single circuit card, the single circuit card input (HAICCOV) from the circuit mask memory control is high. HA1CCOV, HBHAIOV, and the full count signal (HBLAFO) from the test clock control produce the latch (HAENES). (See figure 7-30.) HAESCA sets the

function test complete latch and logic output (HAENES) to high. (See figure 7-30.) Regardless of which inputs produce the test complete latch 1 (HAENES), HAENES high is clocked into the functional test complete pulse generator by the next 4 MHz clock (HBT4CO). After one clock, the pulse generator sends the test complete reset signal (HAFTCP) to the IC counter control, and HAFTIOV to the state logic. When HAFTCP goes low, the control produces a low HAENAS and a low HAENRAV. (See figure 7-30.) HAENRAV from the control resets the IC counter. The low HAENAS resets the circuits counter and functional test complete latch and logic. The output (HAENES) goes low when the latch is reset. Test complete pulses 1 and 2 are clocked out by the next 4 MHz clock (HBT4CO) after HAFTCP is produced. The pulse generator sends pulse I (HAFTBP) to the self-test logic and pulse 2 (HAFTBQ) to the card ID random binary logic.

7-21. Mask Memory Control (fig. 7-33). The mask memory control logic is located in the right-hand card cage. The function of this logic is to mask the lines to the CUT that are not used by the test pattern. Application of the mask is controlled by gates which correspond to the IC under test. All lines not gated are forced low and are not applicable to the circuit under test. This is the untested IC mask. The gated lines are under the control of the circuit mask memory which is addressed by the circuit under test. The test pattern for the IC circuit may not require all lines that are gated; the memory output forces the lines unused by the test pattern to low. This is the untested circuit mask. The lines applicable to control by the test pattern and I/O mask are left high. The masks are applied to the probe control and data compare logic.

    a. The circuit mask memory is enabled by the enable circuit mask memory input (HAECMOV) from the circuit mask memory control. When enabled, the memory outputs the circuit mask (HAGA1 IV1 to HAGA98V1), which corresponds to the mask memory address (HAAM 1 OV to HAAM60V). The circuit mask outputs are applied to the circuit mask gated drivers. The circuit mask remains as inputs to the gated drivers until gated through to the output as the gated circuit mask (HAGO10V to HAG720V) by one or more of the high circuit mask gates (HAEN10V, and HAGAAAV to HAGAYO) from the gate logic. The gates determine which of the 72 lines (HAG010V to HAG720V) are controlled by memory. The circuit mask gates are produced by a combination of gates (HAEN10V to HAEN60V and HAEN1A to HAEN6A) from the IC enable control, and of card identifying inputs (HAMGC3T, HA1CCOV, HA5CCOV, and HA6CCO) from the mask memory control. HAEN10V to HAEN60V are high level gates that occur simultaneously with the low level gates HAEN1A to HAEN6A. The gates identify the IC under test as a number between one and six. The single circuit card signal (HAMGC3T)

and single circuit card* signal (HA1CCOV) when low indicate that the CUT is a single circuit card. When HASCCOV is high, the CUT is a S-IC card, or when HA6CCO is high, the CUT is any 6-IC card. The gated circuit mask outputs are sent to the probe control logic and to the data compare logic.

b. The 1 24-card input (HBWAKA) from the Card ID Decode for Clock Insertion Logic and HAG660V produce the 1 24-card gated (HAGM3A) which is sent to the probe control logic.

c. The HAGO1A to HAG72A signals go to the data compare logic where they assure a 1.5v bias on the data lines during continuity test.

7-22. Control Word Memory (fig. 7-34). Control word memory logic is located on pcbs located in the left-hand card cage of the MTS. The logic is comprised primarily of ROMs, programmed to respond with test clock control data based on X and Y memory address inputs. The control data is used to specify if clocks are required for a particular card under test. If required, the number of clock pulses, as well as their polarity, are established and then executed during functional testing. In addition, the clock pin-assignment is determined for functional modem cards, if applicable.

a. Control Word Storage. Control words originate from two major groups of ROMs: control word A ROM storage, and control word B ROM storage. Addressing to the ROMs is structured so that a 9-bit X address (HBK00OV, HBK01OV to HBK080V) is common to both A and B groups. Although the 6-bit Y address (HBYA1OV to HBYA60V) to group A appears unique, as does the 6-bit Y address (HBYB10V to HBYB60V) to group B. it is noted both sets of Y addresses originate from a common source. (A separate group of inverters in the memory "Y" address function account for this difference in signal names.) Figure 7-35 shows a simplified diagram of the ROM addressing organization. Note that all outputs for a specific bit are common and constitute a wire-OR operation. Control word A outputs (HBCA1B1 to HBCA8B1) and control word B outputs (HBCBIB1 and HBCB2BI) are used by the test clock control logic. The purpose of this function is to specify the number of clock pulses to be generated for a functional test. Five bits of the control word B output (HBCB3B to HBCB7B1) are routed to the strobe generator to provide additional control functions. The control word B bit 8 output (HBCB8B1) goes to the state logic function to inhibit data sampling.

b. Strobe Generation. The strobe generator consists of logic that provides temporary storage and decoding of control word B bits 3 to 7 (HBCB3BI to HBCB7B1). Temporary storage is accomplished when the timing input (HBTE3A) occurs, acting as a clock signal. The reset input is used to reset only that logic associated with the bit 7 input and related control word strobe 7 output (HBCK70V). In general, the five input bits are used to produce the following outputs: clock

required A (HBCWDOE) and clock polarity (HBCWDIE) for the test clock control logic; control word strobe 1 to 7 (HBCK1OV to HBCK70V) for the probe control logic; and a steady low pulldown level (HBBCRAV) for the memory "Y" address function. Table 7-16 shows all input-versus-output variables based on the control word B input bits 3 to 7, subject to the normal enabling of ROM storage and the timing input (HBTE3A) to the strobe generator.

7-23. I/0 Mask Memory Detailed Description (fig. 7-36). The I/O mask memory is located in the right-hand card cage. The function of the memory is to store the I/O mask, which corresponds to the input/ output requirements of the CUT, and to send the I/O mask to the probe control and data compare logic when enabled during the functional test. The I/O mask determines which lines are input and output for the test pattern. The card ID inputs (HBCIOB1 to HBCISBI) are applied to the drivers. The outputs of the drivers are the I/O mask memory address lines HAHAOAV to HAHA5AV and HAHAOOV to HAHASOV. The respective outputs are sent to the data compare logic and the mask memory ROMs. HAHAOOV to HAHASOV can be monitored at connector J7. When the memory is enabled by function test enable inputs four and five (HARM40V and HARM50V), the output of the memory is the I/O mask (HAH011V to HAH098V) which is sent to the probe control logic and the data compare log-c.

7-24. Card ID Decode for Clock Insertion (fig. 7-37). The card ID decode for clock insertion logic is located on PC boards located in the left-hand card cage of the MTS. The function of this logic is to provide control outputs for various logic functions by decoding card ID inputs. Output control functions are provided for clock insertion by the probe control logic, special card test logic, clock and timing, mask memory control, and state logic.

a. Octal Decoding/Encoding. All control outputs are generated primarily in response to the 6-bit inputs for the CUT or self-test card ID (HBCIOB1 to HBCI5B1). The inputs are divided into two groups of three bits each for decoding by octal decoders 1 and 2. Pulldowns HBGN10V and HBGN20V are used to provide logic zero inputs for decoding purposes. The outputs from octal decoders 1 and 2 (HBW 1 AOV to HBW8AOV, and HBW1BOV to HBW3BOV, respectively), represent a two-digit octal code; octal decoder 1 forms the least significant bit of the octal code. The octal encoding logic is used to combine the two digits into a one-line control output. Note that only one line of each decoder is high-true for a given input bit configuration, Also note that up to three separate output signals from the encoding logic may be generated from a single octal value; eg, 03 enables HBWAYO, HBWAZO, and HBWBAOV.
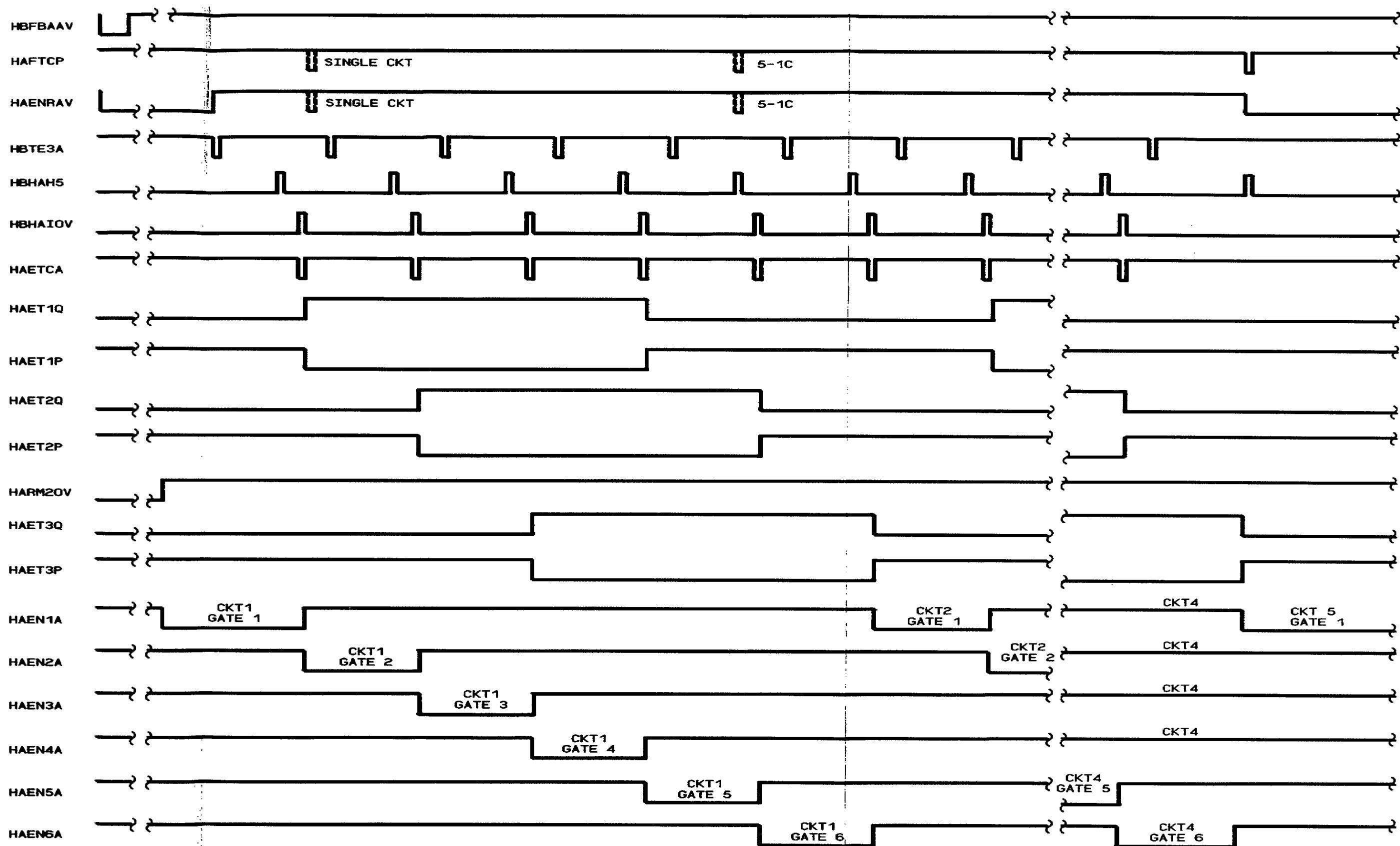
*Figure 7-31. IC Counter Timing Diagram*

7-199/(7-200 blank
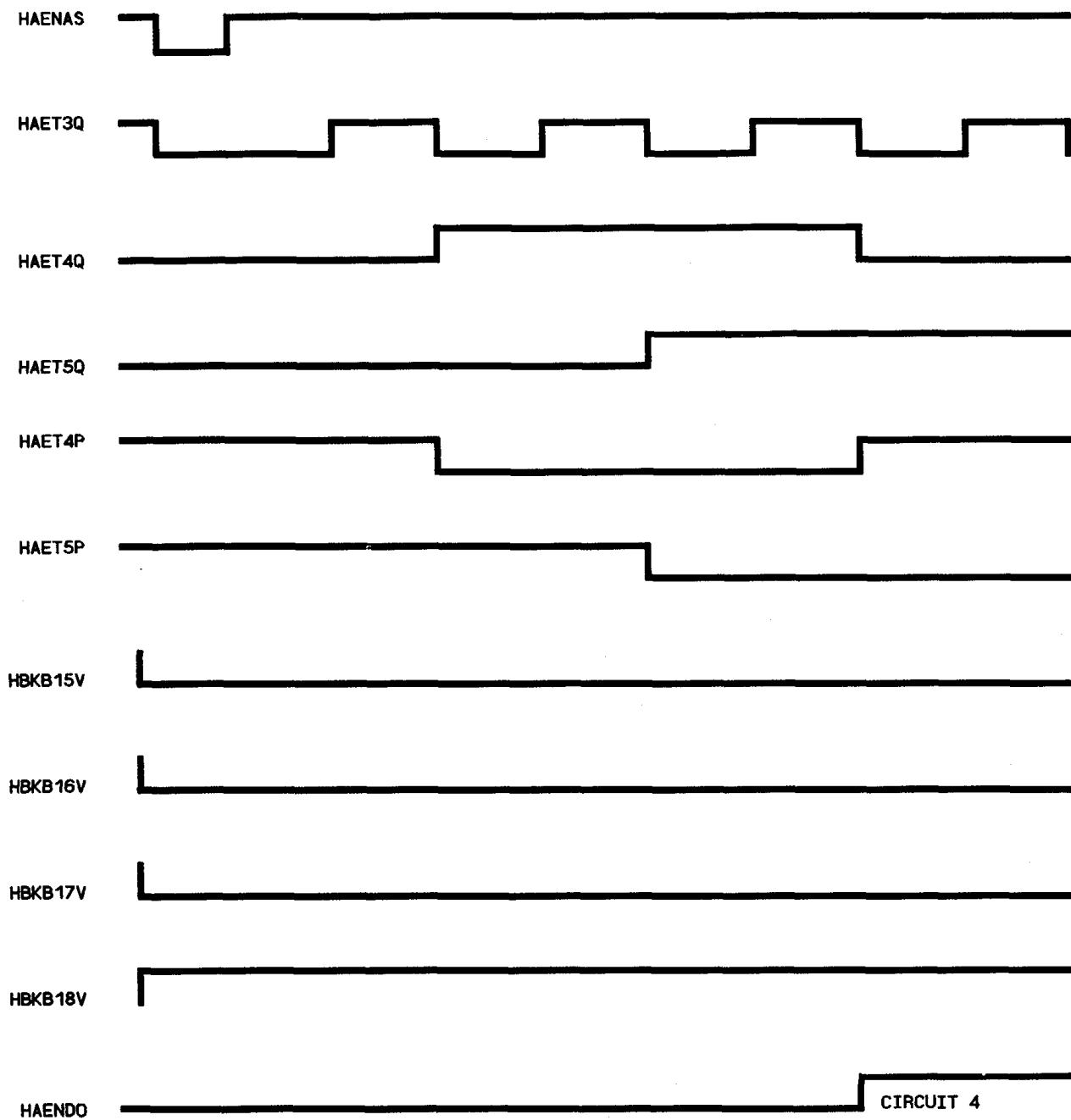
FIGURE 7-32. Circuits counter Timing Diagram

MS 428247

7-201/(7-202 blank)

CIRCUIT MASK
HAGA11V1 TO HAGA18V1
HAGA21V1 TO HAGA28V1
HAGA31V1 TO HAGA38V1
HAGA41V1 TO HAGA48V1
HAGA51V1 TO HAGA58V1
HAGA61V1 TO HAGA68V1
HAGA71V1 TO HAGA78V1
HAGA81V1 TO HAGA88V1
HAGA91V1 TO HAGA98V1 (72 LINES)

MASK MEMORY
ADDRESS
HAAM10V TO HAAM60V (6 LINES)

FROM
CIRCUIT
MASK
MEMORY
CONTROL
(7-27)

ENABLE CIRCUIT
MASK MEMORY
HAECMOV

CIRCUIT
MASK
MEMORY

GATED CIRCUIT MASK
HAGO10V TO HAG720V (72 LINES)

TO PROBE CONTROL
LOGIC (7-40)
AND DATA COMPARE
LOGIC (7-41)

GATE CT-1 CIRCUIT MASK GATE
HAEN10V

GATES CT-1 TO CT-6
HAEN10V TO HAEN60V (6 LINES)

FROM
IC ENABLE
CONTROL
(7-29)

IC GATES 1 TO 6
HAEN1A TO HAEN6A (6 LINES)

SINGLE CKT CARD
HAMGC3T

ANY 6-IC CARD
HA6CCO

FROM
CIRCUIT
MASK
MEMORY
CONTROL
(7-27)

5-IC CARD
HA5CCOV

SINGLE CKT CARD *
HA1CCAV

GATE
LOGIC

CIRCUIT MASK GATES
HAGAAAV, HAGABAV, HAGAEO
HAGAFO, HAGAGO, HAGAJO
HAGAKO, HAGANO, HAGAPO
HAGASO, HAGATO, HAGAWO
HAGAXO, HAGAYO (14 LINES)

FROM CARD ID
DECODE
FOR CLOCK
INSERTION
(7-37)

124 CARD
HBWAKA

CIRCUIT
MASK
GATED
DRIVERS

BIAS CONTROL
HAGO1A TO HAG71A (54 LINES)

TO DATA
COMPARE LOGIC
(7-41)

124 CARD GATE
HAGM3A

TO PROBE CONTROL
LOGIC (7-40)

Figure 7-33. Mask Memory Control Block Diagram

MS 428248

7-203/(7-204 blank)
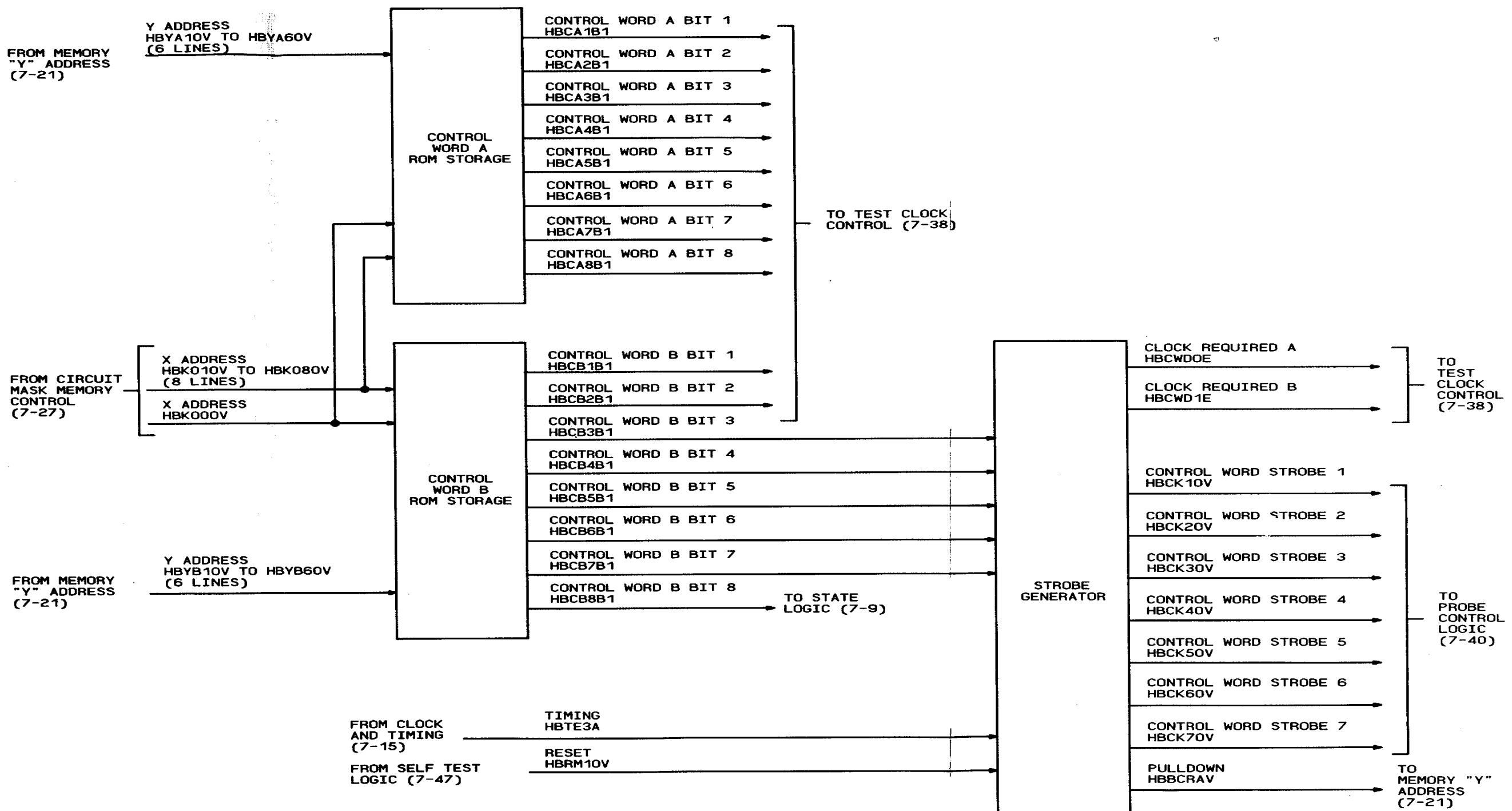
Figure 7-34 . Control Word Memory Block Diagram

7-205/(7-206 blank)
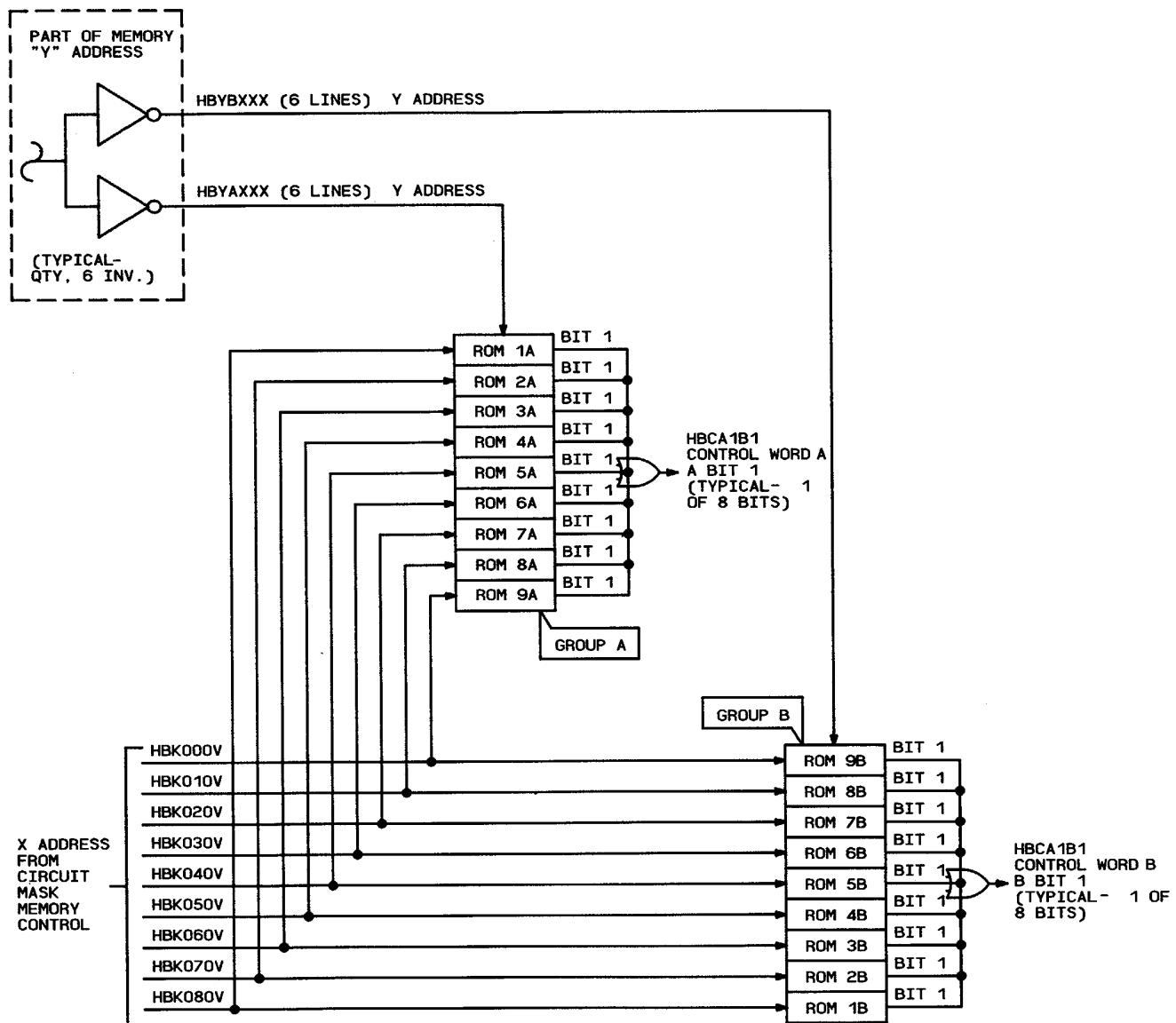
Figure 7-35. Control Word A and B ROM Storage Simplified Block Diagram

MS 428279

7-207

Table 7-16. Strobe Generator Truth Table

INPUTS					OUTPUTS								
HBCB7B1	HBCB6B1	HBCB5B1	HBCB4B1	HBCB3B1	HBCK70V	HBCK60V	HBCK50V	HBCK40V	HBCK30V	HBCK20V	HBCK10V	HBCWDIE	HBCWDOE
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0	0	1
0	0	0	1	0	0	0	0	0	0	0	0	1	0
0	0	0	1	1	0	0	0	0	0	0	0	1	1
0	0	1	0	0	0	0	0	0	0	0	1	0	0
0	0	1	0	1	0	0	0	0	0	0	1	0	1
0	0	1	1	0	0	0	0	0	0	0	1	1	0
0	0	1	1	1	0	0	0	0	0	0	1	1	1
0	1	0	0	0	0	0	0	0	0	1	0	0	0
0	1	0	0	1	0	0	0	0	0	1	0	0	1
0	1	0	1	0	0	0	0	0	0	1	0	1	0
0	1	0	1	1	0	0	0	0	0	1	0	1	1
0	1	1	0	0	0	0	0	0	1	0	0	0	0
0	1	1	0	1	0	0	0	0	1	0	0	0	1
0	1	1	1	0	0	0	0	0	1	0	0	1	0
0	1	1	1	1	0	0	0	0	1	0	0	1	1
1	0	0	0	0	0	0	0	1	0	0	0	0	0
1	0	0	0	1	0	0	0	1	0	0	0	0	1
1	0	0	1	0	0	0	0	1	0	0	0	1	0
1	0	0	1	1	0	0	0	1	0	0	0	1	1
1	0	1	0	0	0	0	1	0	0	0	0	0	0
1	0	1	0	1	0	0	1	0	0	0	0	0	1
1	0	1	1	0	0	0	1	0	0	0	0	1	0
1	0	1	1	1	0	0	1	0	0	0	0	1	1
1	1	0	0	0	0	1	0	0	0	0	0	0	0
1	1	0	0	1	0	1	0	0	0	0	0	0	1
1	1	0	1	0	0	1	0	0	0	0	0	1	0
1	1	0	1	1	0	1	0	0	0	0	0	1	1
1	1	1	0	0	1	0	0	0	0	0	0	0	0
1	1	1	0	1	1	0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	0	0	0	0	0	1	0
1	1	1	1	1	1	0	0	0	0	0	0	1	1

I/O MASK MEMORY

FROM
SELF TEST
LOGIC
(7-47)

FUNCTION TEST ENABLE 4
HARM40V

MASK
MEMORY
ROM 1

I/O MASK
HAHO11V TO HAHO18V (8 LINES)

MASK
MEMORY
ROM 2

I/O MASK
HAHO21V TO HAHO28V (8 LINES)

MASK
MEMORY
ROM 3

I/O MASK
HAHO31V TO HAHO38V (8 LINES)

CARD ID
HBCIOB1

CARD ID
HBCI1B1

CARD ID
HBCI2B1

MEMORY
ADDRESS
DRIVERS

MASK
MEMORY
ROM 4

I/O MASK
HAHO41V TO HAHO48V (8 LINES)

FROM
CARD ID RANDOM
TO BINARY
LOGIC
(7-19)

CARD ID
HBCI3B1

CARD ID
HBCI4B1

CARD ID
HBCI5B1

I/O MEMORY ADDRESS
HAHAOOV TO HAHA5OV (6 LINES)

MASK
MEMORY
ROM 5

I/O MASK
HAHO51V TO HAHO58V (8 LINES)

TO
PROBE CONTROL
(7-40)
AND
DATA COMPARE
LOGIC
(7-41)

I/O MEMORY ADDRESS
HAHAOAV TO HAHA5AY

TO
DATA
COMPARE
LOGIC (7-41)

MASK
MEMORY
ROM 6

I/O MASK
HAHO61V TO HAHO68V (8 LINES)

MASK
MEMORY
ROM 7

I/O MASK
HAHO71V TO HAHO78V (8 LINES)

MASK
MEMORY
ROM 8

I/O MASK
HAHO81V TO HAHO88V (8 LINES)

FROM
SELF TEST
LOGIC
(7-47)

FUNCTION TEST ENABLE 5
HARM5OV

MASK
MEMORY
ROM 9

I/O MASK
HAHO91V TO HAHO98V (8 LINES)

Figure 7-36. I/O Mask Memory Block Diagram

MS 428249

7-209/(7-210 blank)

-15V UMBILICAL
CONTROL ON-H
HBWBCA

FROM STATE
LOGIC
(7-9)

RESET
HBFACR

SPECIAL
CARD TEST
CONTROL
LOGIC

+5V CLOCK PULLUP
CONTROL ON-L
HBWBDA

TO SPECIAL CARD
TEST LOGIC (7-13)

CUT OR
SELF TEST
CARD ID
HBCI0B1 TO HBCI2B1 (3 LINES)

FROM CARD
TO BINARY
LOGIC
(7-19)

FROM LAMP
TEST LOGIC
(7-45)

PULLDOWN
HBGN10V

OCTAL
DECODER 1

OCTAL 0 TO 7
HBW1AOV TO HBW8AOV (8 LINES)

OCTAL
ENCODING
LOGIC

OCTAL 23
HBWASOV

OCTAL 20
HBWAMOV

OCTAL 25
HBWANOV

OCTAL 17
HBWAPOV

OCTAL 17 OR 25
HBWAQO

OCTAL 24
HBWATOV

OCTAL 17 OR 24
HBWAUO

OCTAL 15
HBWAWOV

OCTAL 16
HBWAIA

OCTAL 16
HBWAXOV

OCTAL 07
HBWAKA

OCTAL 21
HBWAVOV

HBWAZO
(OCTAL 03 OR 07) -5V I/O CONTROL

HBWAYO
(OCTAL 03, 07, OR 14) +12VSC CONTROL

HBWBAOV
(OCTAL 03) +5V I/O CONTROL

OCTAL 07
HBWBBOV

OCTAL 26
HBWCIA

TO PROBE CONTROL
LOGIC (7-40)

TO CLOCK AND
TIMING (7-15)

TO MASK MEMORY
CONTROL (7-33)

TO TEST CLOCK
CONTROL (7-38)

TO SPECIAL CARD
TEST LOGIC (7-13)

TO SPECIAL CARD
TEST LOGIC (7-13) AND
STATE LOGIC (7-9)

TO STATE LOGIC
(7-9)

CUT OR
SELF TEST
CARD ID
HBCI3B1 TO HBCI5B1 (3 LINES)

FROM CARD
TO BINARY
LOGIC
(7-19)

FROM LAMP
TEST LOGIC
(7-45)

PULLDOWN
HBGN20V

OCTAL
DECODER 2

OCTAL 00, 10, AND 20
HBW1BOV TO HBW3BOV (3 LINES)

FROM STATE
LOGIC
(7-9)

STATE 5
HBST5Q

STATE 9*
HBST9P

STATE 1*
HBST1AV

CONTROL
LOGIC FOR
SINGLE
CARD TEST
+5V SUPPLY

+5V
CONTROL
ON-L
HBWC3S

TO SPECIAL CARD
TEST LOGIC (7-13)

Figure 7-37. Card ID Decode for Clock Insertion Block Diagram

7-211/(7-212 blank)

MS 428263

Table 7-17. Special Card Test Control Logic, Truth Table

| Inputs | | Outputs | |
HBFACR	HBWASOV	HBWBDA	HBWBCA
0	0	1	1
0	1	0	1
1	0	1	0
1	1	1	0

    b. Special Card Test Control Logic. This logic function is used to develop two outputs: -15v umbilical control on = H (HBWBCA) and + 5v clock pullup control on = L (HBWBDA). Inputs reset (HBFACR) and octal 23 (HBWASOV) control the outputs to the special card test logic as shown in table 7-17.

    c. Control Logic for Single Card Test + 5v Supply. This logic function is used to develop + 5v control on = L (HBWC3S) from the inputs octal 26 (HBWCIA), state 5 (HBST5Q), state 9* (HBST9P), and state 1* (HBST1IAV). Table 7-18 shows the relationship between all input variables and resultant output.

7-25. Test Clock Control Logic (fig. 7-38). The test clock control logic is located mainly on pcbs which are located in the left-hand card cage. This logic consists of sequential and combinational logic circuits. The logic provides the test clocks used by the probe control logic when the test requires clock signals. The need for clock signals depends on the CUT. In addition, the logic provides the test clock in progress, full count, and sample for error signals. These signals are used by memory Y address, IC count enable, and lamp driver logic functions, respectively.

    a. Test Clock Generation (fig. 7-39). The test clock logic provides a negative test clock and three clocks. The negative test clock (HBCP1A) is generated from the active high test clock B (HBLHLOV) when the enable signal (HBWAVOV) is high. Test clock A (HBLAMA) is generated when the circuit under test (CUT) requires positive test clocks. HBLAMA is activated low when HBCWDOE, HBCWDIE, and HBTE1OV are high. Test clock B (HBLHLOV) is generated when the CUT requires negative test clocks. HBLHLOV is activated high when the clock polarity signal (HBCWDIE) is low and clocks required (HBCWDOE) and HBTE1OV are high. The identical test clocks C (HALDDAV and HALDCAV) are activated high when HBCP1 A is low. All tests clocks are generated in accordance with the card ID of the CUT connected to the probe control logic.

    b. *Test Clock In Progress Generation..* The active low test clock in progress signal ((HBLAKP)) is generated by the low to high transition of the timing signal ((HBTE7A)) when HCBWDOE is high. It remains low until the test clock counter is filled. When the test clock counter is full, the low counter full signal ((HBLAEA)) in conjunction with the high HBTE60V will reset the HBLAKQ and HBLAKP signals. The start test reset signal ((HBFBDAV)) resets the counter control circuit and clears the test clock counter before each functional test sequence.

    c. *Test Clock Counter Operation.* The test clock counter provides the active high counter full signals ((HBLA15U,, HBLA25U,, and HBLA35U)) to the full count output logic. The counter full signals are produced when the test clock counter reaches the count specified by the 8-bit control word A ((HBCA1B1-HBCA8B1)) and control word B ((HBCBA1B1,, HBCB2B1,, and HBMXWA)) signals. Initially, the timing signal ((HBTE70V)) clocks the test clock counter; thereafter it is clocked by the timing signal ((HBTE80V)). One counter clock signal ((HBLACO)) is generated each functional test sequence (machine cycle) by the HBTE70V or HBTE80V signals. When the test clock counter is clocked the number of times specified by the control words A and B, the HBLA 15U,, HBLA25U,, and HBLA35U signals are activated high. The three active high signals in conjunction with the low HBLAKP signal drives the counter full signal ((HBLAEA)) to low. The low signal HBLAEA enables timing HBTE60V signal to reset the counter control circuit and terminate the functional test cycle

    d. *Sample For Error Generation.* The sample for error test signal ((HBLAGA)) is generated when the full count signal is true. The HBLAGA signal is gated out by a high HBT40V timing signal and a low control word B bit 8 ((HBCB8B1).

7-213

Table 7-18. Control Logic for Single Card Test +5v Supply, Truth Table

| Inputs | | | | Output |
HBST1AV	HBST9P	HBST5Q	HBWCIA	HBWC3S
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1
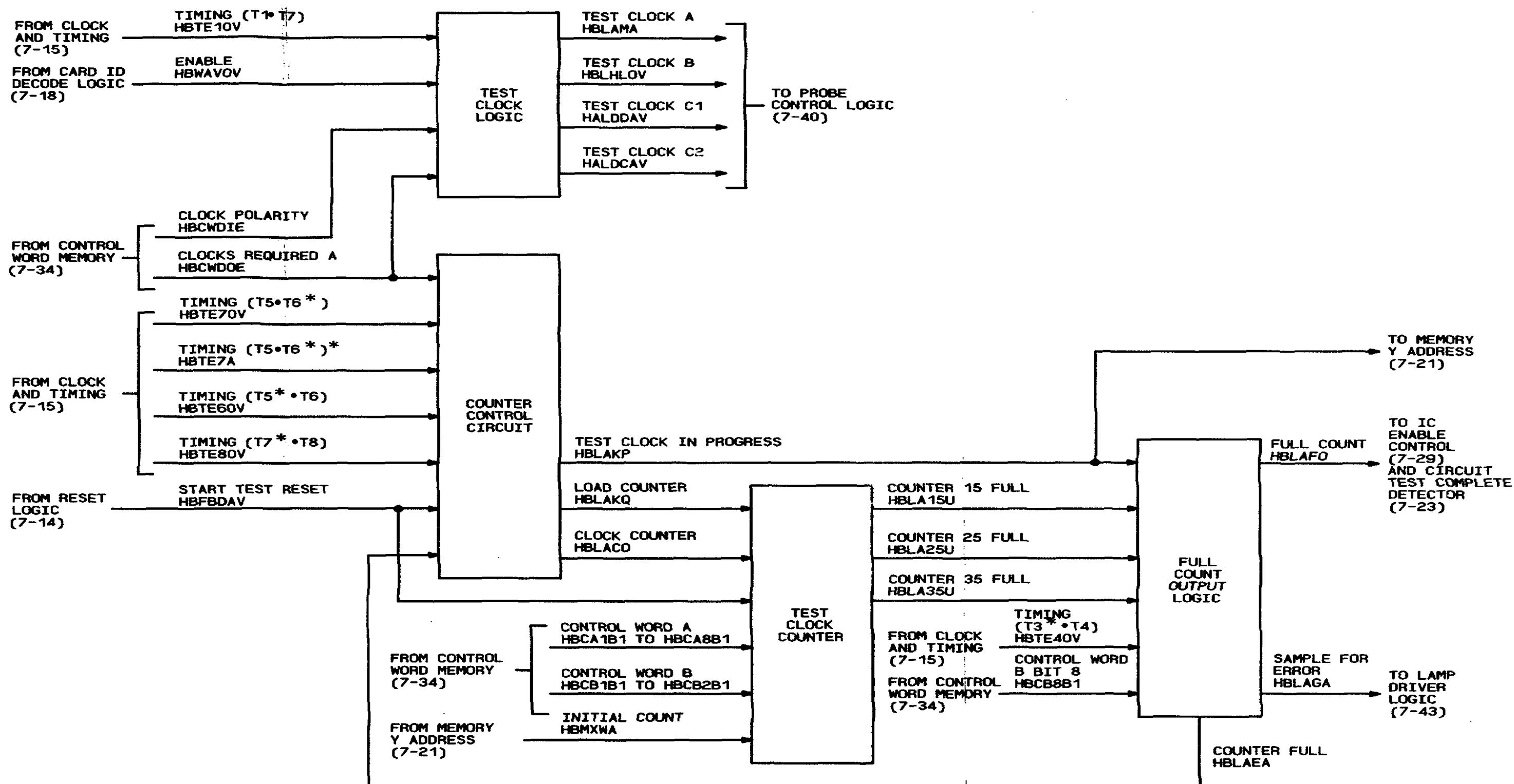
Figure 7-38 . Test Clock Control Block Diagram

MS 428257
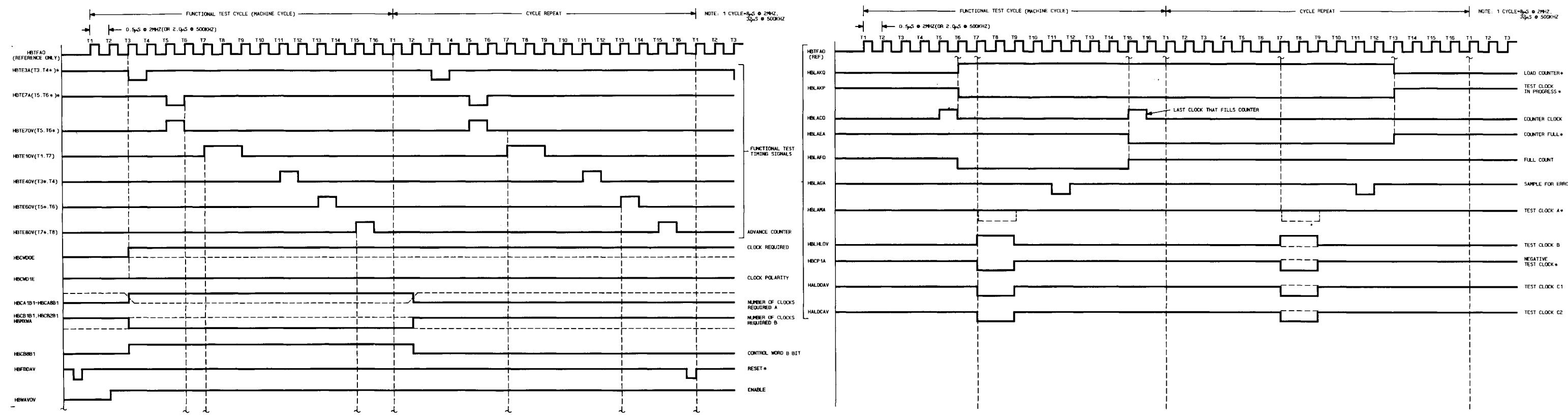
Figure 7-39. Test Clock Control Timing Diagram

7-217/(7-218 blank)

7-26. Probe Control Logic (fig. 7-40). The probe control logic is located on pcbs which are located in the right-hand card cage. The probe control logic consists of gates and inverters which provide probe test data to the CUT probe assembly. Response to the applied probe test is routed from the CUT through the test probe assembly and probe test data logic to the data compare logic. At the data compare logic, the response is compared with the enabled test pattern data to determine if any errors have occurred. In addition, the probe control logic provides the enabled test pattern data to the self-test logic and line termination control to the data compare logic.

a. Strobes and Clocks Logic. The strobes and clocks logic provides active Low negative test clocks or active high positive test clocks in accordance with the card ID of the CUT and test control words from the control word memory function. These clocks are used to clock the test pattern data through the probe test data logic when the CUT contains sequential logic circuits which require clocking. Negative test clocks HBCP3A and double buffered HACP3AV are generated by a high test clock B signal (HBLHLOV) when enabled by a high card ID strobe (HBWAWOV). Similarly, negative test clocks HBCPAA, HBCPOA, and HBCKBA are generated by the high HBLHLOV test clock when enabled by the control word strobes HBCK50V, HBCK60V, and HBCK70V, respectively. Negative test clock HBCP9A is generated by high HBLHLOV and HBWASOV signals. Positive test clocks HBCP2A, HBCP4A thru HBCP8A are generated by the active low test clock A (HBLAMA) when enabled by the high card ID strobes HBAWAMOV, HBWANOV, HBWAPOV, HBWAUO, HBWATOV, and HBWAQO, respectively. Positive test clocks HBBP1A, HBBP2A, HBBP3A, and HBNBCA are generated by the low HBLAMA test clock when enabled by the HBCK10V thru HBCK40V strobes, respectively.

b. Probe Test Data Logic. The probe test data logic consists of gates and inverters, which provide the probe test data, test pattern enabled, and clocked test pattern signals. The probe test data consists of the input test pattern data, which has been clocked and enabled for output to the test probe assembly. The probe test data stimulates the sequential logic in the CUT. The test pattern enabled signals consist of the clocked test pattern data enabled for output to the CUT. These signals are applied to TEST CONNECTOR J7, self-test logic, and data compare logic. The clocked test pattern signals are the test pattern data signals which have been clocked into the probe test data logic by the negative or positive test clocks. These signals are applied to the line terminator control logic to produce the line termination control signals.

(1) The probe test data signals (HAP01D thru HAP72D) are generated from the test pattern data (HAD010E thru HAD173E) when clocked, by negative or positive test clocks and enabled by high circuit mask TM 9-143-655-2-9-2 (HAG010V thru HAG720V) and I/O

mask signals (HAH010V thru HAH095V). The line is an input to the CUT hen the I/O mask is high. The response to the probe test data is received from the test probe assembly on the output data lines (designated by low I/O mask) and routed through the probe test data logic to the data compare logic.

(2) The test pattern enabled signals (HADDAO thru HADDEO) are generated from the HADOIOE thru HAD173E signals when enabled for output to the data compare logic by the applicable high HAGOIOV thru HAG720V signals. These signals are also used for self-test and can be monitored at TEST CONNECTOR J7.

c. Line Terminator Control Logic. The line terminator control logic consists of gates and inverters, which provide the line termination control signals. The line termination control signals (HAL04A thru HAL69A) are generated by the clock test pattern signals (HAIAFA, HAI060A, HAI08A, HAI 1 4A, HAIBGA, HAI19A, HAICCA, HAICFA, HAI23A, and HAI29A) when enabled by the applicable high circuit mask, I/O mask, and 124 card gate (HAGM3A) signals. Refer to the probe control logic diagram for detailed information. In continuity test, these signals to the data comparator provide + 1.5v bias for the applicable data lines.

7-27. Data Compare Logic (fig. 7-41). The data compare logic is on the pcb, which is located in the analog card cage. This logic consists of differential line receivers, ROM, and associated combinational logic circuits. The data compare logic provides 72 data channels which are connected to the input/output data lines to and from the test probe assembly. The data compare logic comprises 12 test set data comparator pcbs and two line terminator pcbs. Each test set data comparator PCB contains six data comparator channels, a 64x8 ROM, and six error output logic circuits. Each line terminator PCB contains 36 transistor switch circuits. The data compare logic compares known test pattern data and two reference voltages to the probe test data response from the CUT. The comparison results in GO/NO-GO indications, during continuity and functional tests, when using the test probe assembly.

a. ROM Function. A ROM, located on each test set data comparator pcb, provides channel select and IC number control signals. The ROM is addressed by six I/O mask signals (HAHAOAV thru HAHA5AV). The HAHAOAV thru HAHASAV signals are sent to the test pattern memory and applied through card ID drivers to the ROM as the card ID signals (HCIDOO through HCID50). These signals identify the CUT and cause the ROM to assert six channel select (BO-B6) and two IC number signals (B7, B8) in accordance with the card ID of the CUT. The channel select signals are asserted high to select and enable the desired data comparator channel. The IC number signal is asserted low to indicate that the CUT contains a single IC or 14-pin ICs. The IC number

signals are used to gate the continuity and functional error signal through the proper error output logic gates.

b. *Data Comparator Functions*. The data compare logic contains 72 similar data comparator circuits. Each data comparator circuit consists of two differential line receivers, an exclusive OR, and a NAND gate. The two differential line receivers are used as analog comparators, and compare the data on the probe test data response (HAP0ID thru HAP72D) signals to + 1v and +2v reference levels.

(1) *Continuity tests*. During continuity tests, the HAP01D thru HAP72D data lines are compared to + 1v and +2v reference levels. A continuity error will be detected when the data line signals are more than 1v but less than 2v and, conversely, no continuity error is detected when the data line signals are less than 1v or more than 2v. A continuity error is indicated by an active low output from the 2v comparator. The active low continuity error * signal is applied to the error output logic for output to the appropriate lamp driver logic circuit and to TEST CONNECTOR (J7), where it can be monitored during diagnostic test procedures.

(2) *Functional tests*. During functional test, the HAP01D thru HAP72D are compared to the 1v reference and the result applied to an exclusive OR gate. The exclusive OR compares the 1v comparator output to the corresponding test pattern enabled signals (HADAAO thru HADDEO), bit-by-bit. A functional error is detected when the two inputs to the exclusive OR are not the same logic level. If one is high in respect to the other an active-high functional error signal will be produced and applied to a NAND gate. The NAND gate is enabled by a corresponding and active high circuit mask inverted signal (HAG010V thru HAG720V) when the data line is being tested and will produce the active-low functional error * signal. This signal is applied to the error output logic and TEST CONNECTOR (J7).

c. *Error Output Logic*. The error output logic consists of inverters and NAND gates, which are used in combination to output the detected continuity and functional error signals on the appropriate output line. The detected error signals are sent to the lamp driver logic for display on the MTS front panel and test probe assembly error indicators. Each error output logic produces six signals (two continuity and four functional) which are wire-O Red with the six similar error signals from the other data channels on a test set data comparator pcb. The six wire-O Red signals are brought out the pcb connector and again wire-O Red with other similar groups of error signals from the other data comparator channels. The wire-O Red outputs are then applied to the lamp driver logic. The output logic produces two active-low continuity error signals (14-Pin IC Continuity Error * and 16-Pin IC Continuity Error*). When low, the IC number signal indicates a 14-pin IC CUT and when high indicates a 16-pin IC cut. Thus, a continuity error is enabled onto the appropriate output 7-

220 line by the IC number signal. Functional errors are similarly routed to appropriate output lines by the IC number and also by the I/O mask memory signals (HAH011V1 thru HAH098V1). A high HAH011V1 thru HAH098V1 signal indicates that the data line being tested is an input data line and, conversely, a low signal indicates that the data line tested is an output data line. The HAHO1 IV1 thru HAH098VI signals gate the detected functional error through the appropriate output data line to indicate whether they are errors on input or output data lines, to and from the test probe assembly.

d. *Line Terminator*. The line terminator logic consists of 72 transistor switches, which apply a + 1.5v or +5v bias on the HAP0ID thru HAP72D data lines. The transistor switches are turned on or off according to the card ID of the CUT. During continuity tests, the line terminator logic places a + 1.5v bias on the data lines being tested by use of the 15 line termination control signals (HAL04A thru HAL69A) and 57 circuit mask signals (HAG01A thru HAG071A and HAGM1A, HAGM2A, HAGM4A). During functional tests, the activated line termination control and circuit mask signals cause the transistor switches to apply + 5v to the applicable HAP0ID thru HAP72D data lines being used.

7-28. Error Detection (fig. 7-42). Error detection logic is located on pcbs in the left-hand card cage of the MTS. The function of this logic is to provide control signals to the GO and NO-GO probe and front panel indicator lamps. The lamps are lighted or turned off, depending on MTS test conditions and results. In addition, a control signal is also supplied for the front panel REPEAT CYCLE indicator lamp when activated by related control logic.

a. *Error Condition Logic*. This logic constantly monitors all possible error conditions that could result while a test is being run for either a CUT or a self-test. If an error condition is detected, a high error output signal (HBJAFO) is produced. This signal is the primary source to turn off the GO lamps after a test is complete. The main group of signals that are monitored consist of three groups of six lines representing continuity errors (HCE01A to HCE06A), functional input errors (HCE07A to HCE12A), and functional output errors (HCE13A to HCE18A). Two additional error signals are monitored as well: self-test error* (HBSAJA) resulting from an incorrect check sum during self-test, and IOC error (HBFAWAV) resulting from IOC error detection in the state logic. The self-test off signal (HBCRIP) is used as an enable (when high) or disable (when low) for the following signals: HCE13A to HCE18A and HBFAWAV. This function is provided so that functional output errors and an IOC error are disregarded for self-test operations. All other error conditions operate as usual for self-test.

b. *Error Control and Lamp Decode*. These logic functions control the timing and on or off condition of the GO/NO-GO lamps. In general, there are four possible
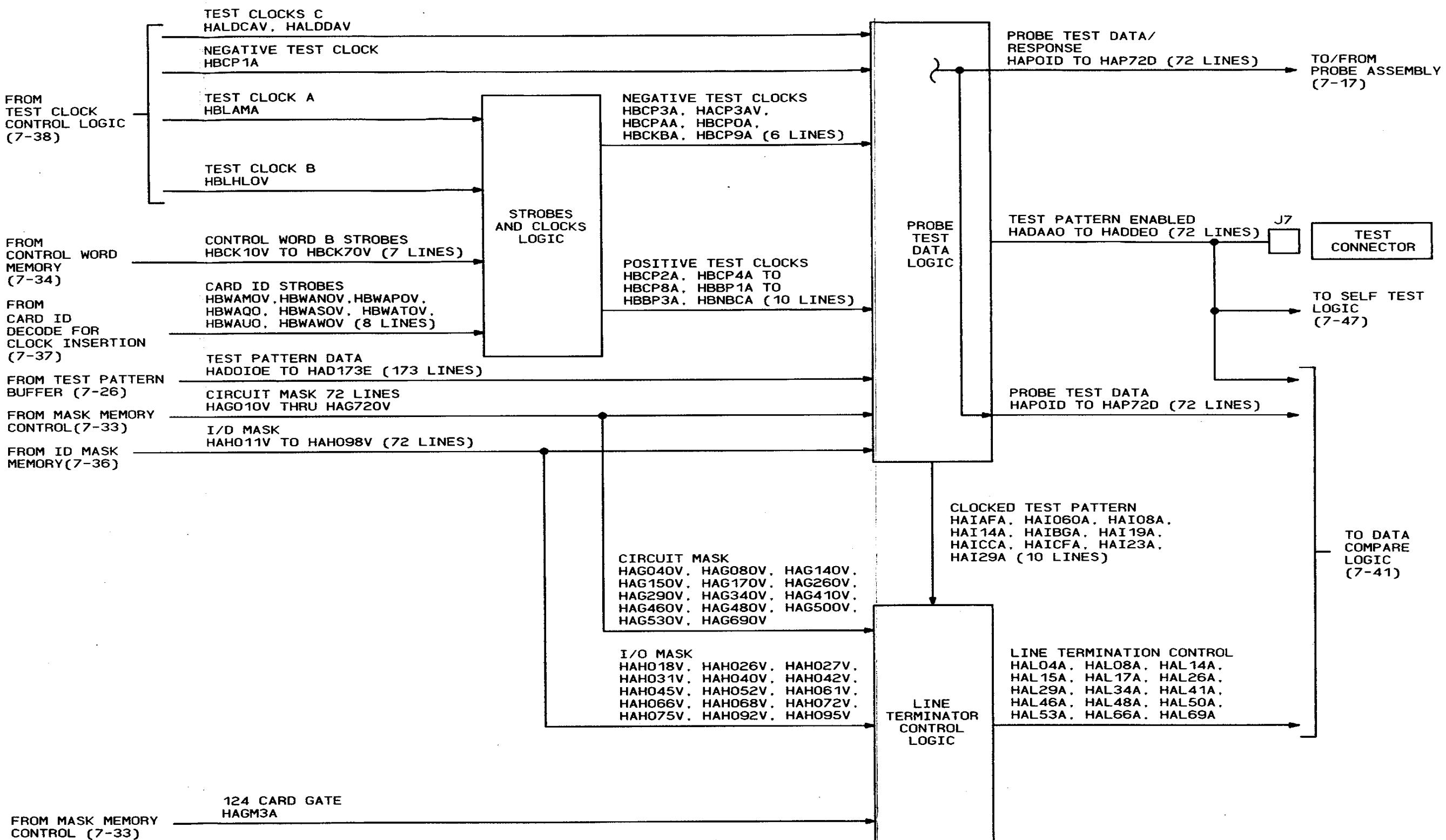
Figure 7-40. Probe Control Logic Block Diagram
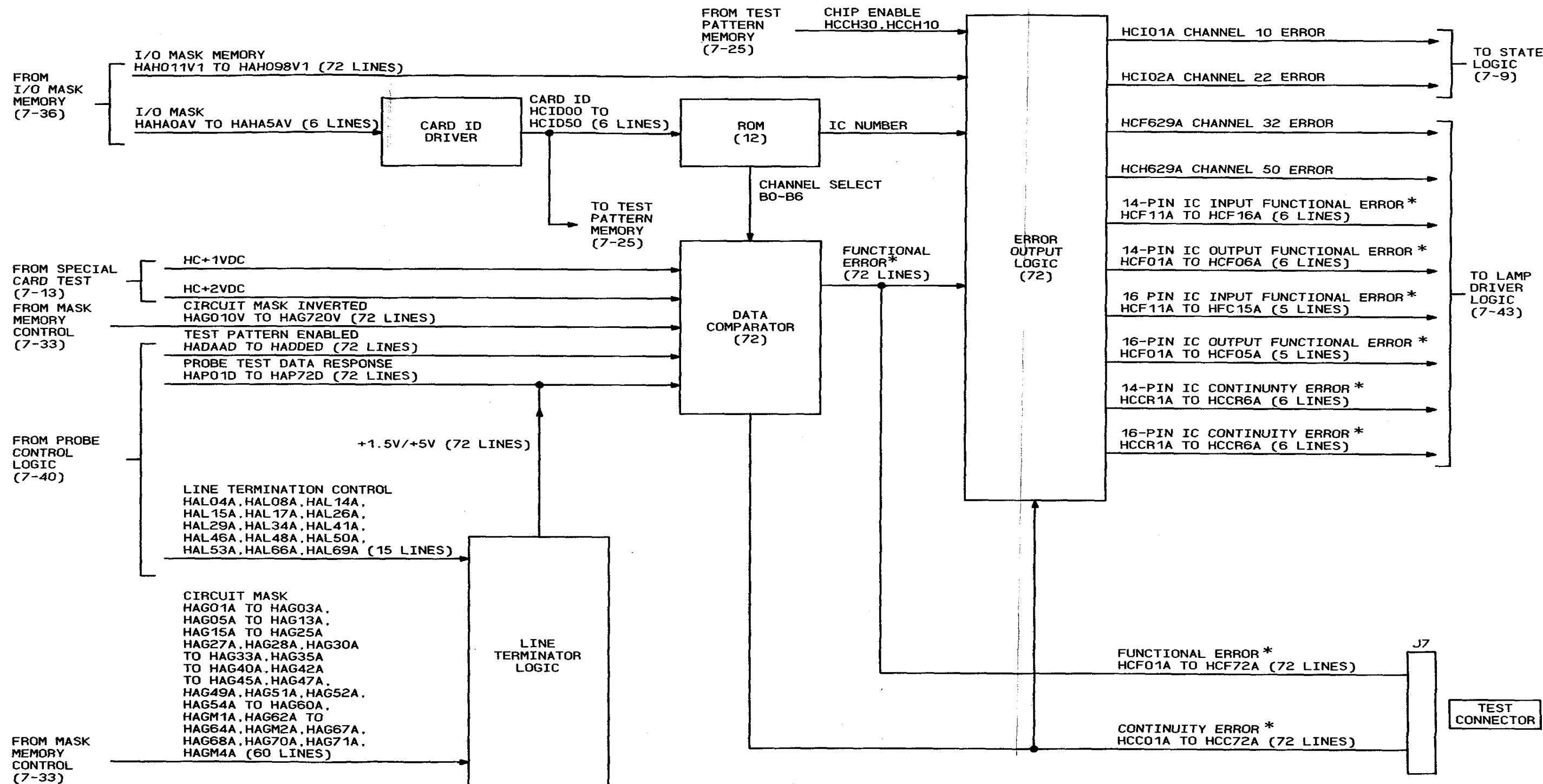
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Figure 7-41. Data Compare Logic Block Diagram
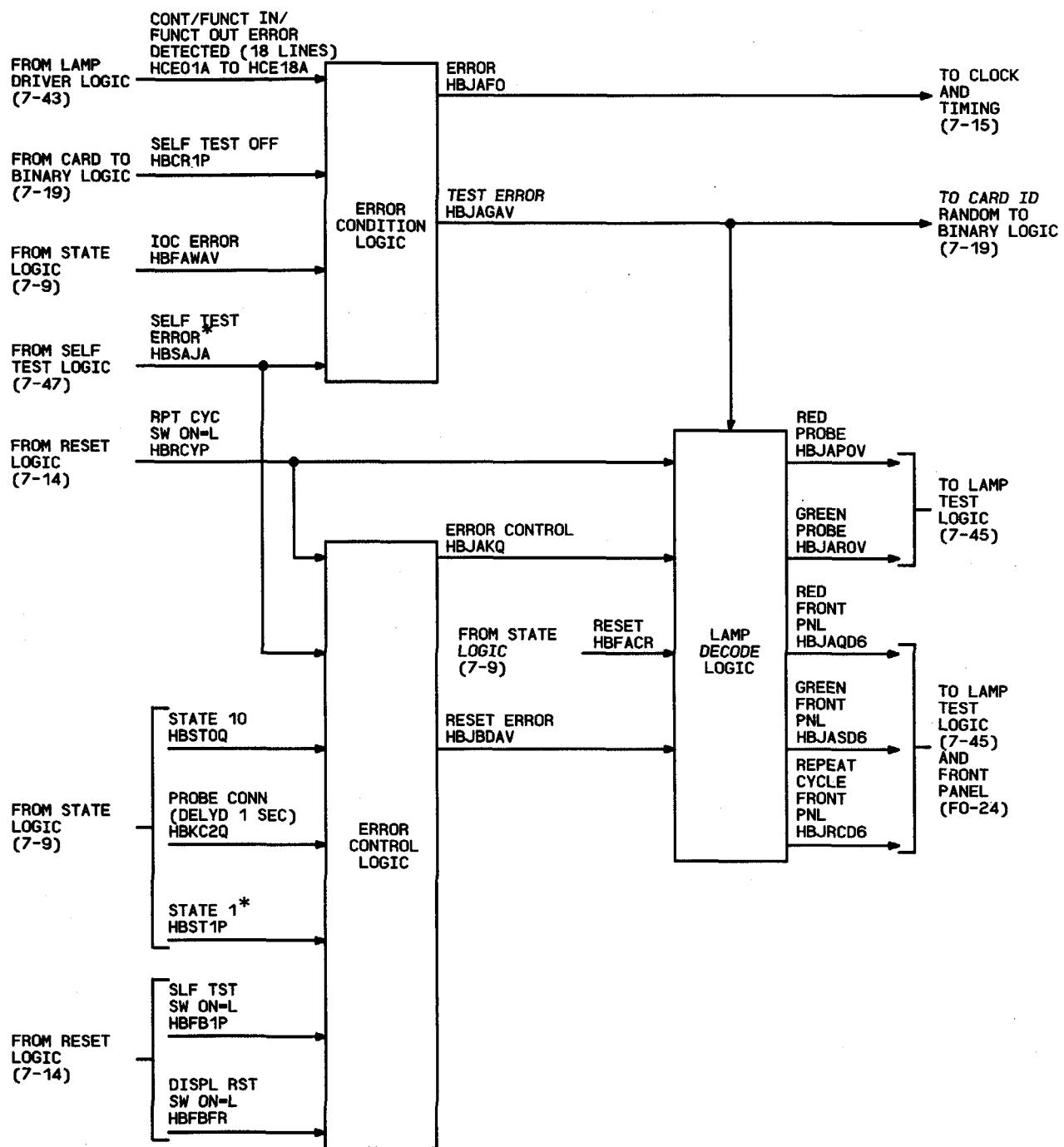
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Figure 7-42. Error Detection Block Diagram

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combinations of lamp conditions (table 7-19); refer to the test sequence column and related on or off lamps for the probe and front panel. Before the probe assembly is connected, all lamps are off. When the probe assembly is connected, all lamps go on while testing is in process. After the test is completed, one of two conditions will have occurred: if an error was detected, the GO lamps go off, or if no error had occurred, the NO-GO lamps go off. The primary signals used to control these conditions are shown in table 7-19. Secondary control signals are as follows:

(1) A group of three signals originates from logic controlled by front panel switch settings: repeat cycle switch on=L (HBRCYP), self-test switch on=L (HBFB1P), and display reset switch on=L (HBFBFR). If any one of these signals goes low-active, all of the GO/NO-GO lamps will remain on until a test cycle is completed.

(2) If a self-test error * signal (HBSAJA) is generated, HBJAFO and HBJAKQ will both go high to turn off the GO lamps at state 10.

(3) The reset error signal (HBJBDAV) is a function of HBKC2Q and HBFBFR. Either low will reset signal HBJAKQ to low and keep all GO/NO GO lamps on.

(4) The reset signal (HBFACR) and HBJAKQ comprise an AND operation. When both signals are high, the REPEAT CYCLE lamp on the front panel will light through a low-active HBJRCD6.

7-29. Lamp Driver Logic (fig. 7-43). The lamp driver logic is located on pcbs located in the analog card cage of the MTS. The function of this logic is to provide latch storage for continuity or functional test error outputs from the data compare logic. The related front panel lamps light in response to any error inputs by means of the latched outputs. The error detect logic also received outputs from the lamp driver logic to control the GO/NO GO lamp indicators.

a. *Typical Latch Operation.* The following paragraphs provide a description of the continuity error latches and lamp drivers. The operation for functional input and output error latches is similar, except as noted. Continuity error signals (HCCRIA to HCCR6A) from the data compare logic represent the end result of MTS operations; ie, if a CUT, or self-test, results in an error, one or more CONTINUITY ERROR lamps will light on the front panel. For example, if continuity error set enable (HBFAGA) is a low active for state 3 strobe time, and a low active error signal occurs for HCCR2A, the following occurs. Lamp driver signal (HCCFZ2) and the continuity error 2 signal (HCE02A) will both go low. Lamp DSOS will then light by HCCFZ2 and stay on until eventually reset, and HCE02A will cause the GO lamp to go off at state ten time. Signal HCCFZ2 is a latched signal and provides lamp drive for DS05, while HCE02A is not latched. All other latches operate in the same manner as the foregoing example, with some

exceptions. The functional error set enable signal (HBLAGA) is used for both the input and output logic, while error reset (HBFBRD1) is common to all latches. HBLAGA is inverted from a low to a high active enable (HCF51A) for the functional input and output error latches. (A similar inversion is performed for HBFAGA, but is not shown on figure 7-43.) The remaining exception for error latches applies to the functional output error logic and is described in the following paragraph. A summary of all input and output signals and their relationship to specific front panel lamps is shown in figure 7-44.

b. *Auxiliary Error Detection Logic.* The functional output error latches and lamp drivers operate exactly as described previously as applied to error inputs (HCFOIA to HCF06A) from the data compare logic. However, for certain card types, the auxiliary error detection logic provides outputs that comprise wire-OR functions to extend the normal error detection functions as follows:

(1) The detect error 02A and 04A outputs (HCF02A and HCF04A) from the auxiliary error detection logic are wire-OR with the corresponding inputs from the data compare logic. Detect error 02A will be low-active when error enable (HCCH20) is high and error 02A (HCF629A) is low. Detect error 04A will be low-active when HCCH20 is high and error 04A (HCH629A) is low.

(2) Detect error #1 and #2 (HCFM 10 and HCFM20) are straight inverse output functions of IOC error # l circuit (HBFAJS) high-in equals HCFM 10 low-out, and IOC error #2 circuit (HBFAKS) high-in equals HCFM20 low-out. These two outputs are also wire-OR to form lamp driver DS16 and DS17 outputs.

7-30. Lamp Test Logic (fig. 7-45). Lamp test logic is on pcbs located in the left-hand, right-hand, and analog card cages of the MTS. This logic is used primarily to provide circuit isolation between normal operational signals that light MTS lamp indicators and the lamp test signals. In addition, lamp and logic driver circuits are provided for miscellaneous functions.

a. *Lamp Test Circuits.* A total of 27 separate lamp test isolation networks are provided. All circuits operate identically to provide a current path for lighting all lamps when the SELF TEST switch is pressed. See figure 7-46 for a typical lamp test circuit for one of the front panel indicators. Assuming the LAMP TEST switch is off, the on or off condition of the CONTINUITY ERROR lamp DS04 is controlled by the related lamp driver circuit. A low output would provide a return path through the lamp to the +5v supply and would light the lamp. A high driver output would turn off the lamp. When the LAMP TEST switch is closed, WSWGND (DC Ground) is switched through the contacts to light the LAMP TEST indicator and also to provide a current path through the diode, the CONTINUITY ERROR lamp, and to +5v.

Table 7-19. Error Detection Truth Table

Switch inputs (see note 2)	Error inputs (see note 1)	State 10 HBSTOQ	Error HBJAFO	Error control HBJAKQ	Probe conn HBKC2Q	State 1* HBST1P	Green front panel HBJASD6		Red front panel HBJAQD6		Green probe HBJAROV		Red probe HBJAPOV		Test sequence summary
							Logic	Lamp	Logic	Lamp	Logic	Lamp	Logic	Lamp	
All 1	Not. appl.	0	0	0	0	0	1	off	1	off	0	off	0	off	MTS pwr on, probe not connected (state 1)
All 1	Not. appl.	0	0	0	1	1	0	on	0	on	1	on	1	on	Probe connected, test in process (states 2 thru 9)
All 1	Any 0 [pulse symbol 1]	1	1	1	1	1	1	off	0	on	0	off	1	on	Test complete, error (no go) detected (state 10)
All 1	All 1 [pulse symbol 1]	0	1	1	1	0	0	on	1	off	1	on	0	off	Test complete, no error (go) detected (state 10)
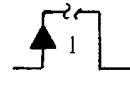
NOTES:
1. Error inputs consists of HCEDIA to HCE18A, HBFAWAV, and HBSAJA. All 1= no error, whereas any 0= an error.
2. Switch inputs consist of HBRCYP, HBFB1P, and HBFBFR. All 1= the related front panel switches are all off.

FROM DATA
COMPARE LOGIC
(7-41)

CONTINUITY ERRORS
HCCR1A TO HCCR6A (6 LINES)

FROM STATE
LOGIC
(7-9)

CONTINUITY ERROR SET ENABLE
HBFAGA

FROM RESET
LOGIC
(7-14)

ERROR RESET
HBFBRD1

CONTINUITY
ERROR
LATCHES AND
LAMP
DRIVERS

LAMP DRV DS04 TO DS09
HCCFZ1 TO HCCFZ6 (6 LINES)

TO LAMP TEST LOGIC (7-45)
AND FRONT PANEL (FO-24)

CONT ERR 1 TO 6
HCE01A TO HCE06A (6 LINES)

TO ERROR DETECT
LOGIC (7-42)

FROM DATA
COMPARE LOGIC
(7-41)

FUNCTIONAL INPUT ERRORS
HCFI1A TO HCFI6A (6 LINES)

FROM TEST CLOCK
CONTROL
(7-38)

FUNCTIONAL ERROR
SET ENABLE
HBLAGA

INV

HCFS1A

FUNCTIONAL
INPUT
ERROR
LATCHES AND
LAMP
DRIVERS

LAMP DRV DS10 TO DS15
HCFFIZ1 TO HCFFIZ6 (6 LINES)

TO LAMP TEST LOGIC (7-45)
AND FRONT PANEL (FO-24)

FUNCT IN ERR 1 TO 6
HCE07A TO HCE12A (6 LINES)

TO ERROR DETECT
LOGIC (7-42)

FROM DATA
COMPARE LOGIC
(7-41)

FUNCTIONAL OUTPUT
ERRORS
HCFO1A TO HCFO6A (6 LINES)

HCFO1A,
HCFO3A,
HCFO5A,
HCFO6A (4 LINES)

FUNCTIONAL
OUTPUT
ERROR
LATCHES AND
LAMP
DRIVERS

FUNCT OUT ERR 3 TO 6
HCE13A TO HCE18A (6 LINES)

TO ERROR DETECT
LOGIC (7-42)

LAMP DRV DS18 TO DS21
HCFFOZ3 TO HCFFOZ6 (6 LINES)

TO LAMP TEST LOGIC (7-45)
AND FRONT PANEL (FO-24)

LAMP DRV DS16
HCFFOZ1

LAMP DRV DS17
HCFFOZ2

FROM TEST
PATTERN MEMORY
(7-25)

ERROR ENABLE
HCCH20

FROM DATA
COMPARE LOGIC
(7-41)

ERROR 02A
HCF629A

ERROR 04A
HCH629A

FROM STATE
LOGIC
(7-9)

IOC ERROR #1 CKT
HBFAJS

IOC ERROR #2 CKT
HHBFAKS

AUXILIARY
ERROR
DETECTION
LOGIC

DETECT ERR 02A
HCFO2A

DETECT ERR 04A
HCFO4A

DETECT ERR #1
HCFM10

DETECT ERR #2
HCFM20

Figure 7-43. Lamp Driver Logic Block Diagram

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HCCR1A	HCCR2A	HCCR3A	HCCR4A	HCCR5A	HCCR6A
HCE01A	HCE02A	HCE03A	HCE04A	HCE05A	HCE06A
HCCFZ1	HCCFZ2	HCCFZ3	HCCFZ4	HCCFZ5	HCCFZ6

DS04   DS05   DS06   DS07   DS08   DS09

—————————————————— CONTINUITY ERROR ——————————————————

HCFI1A	HCFI2A	HCFI3A	HCFI4A	HCFI5A	HCFI6A
HCE07A	HCE08A	HCE09A	HCE10A	HCE11A	HCE12A
HCFIZ1	HCFIZ2	HCFIZ3	HCFIZ4	HCFIZ5	HCFIZ6

DS10   DS11   DS12   DS13   DS14   DS15

—————————————————— FUNCTIONAL INPUT ERROR ——————————————————

HCFO1A	HCFO2A	HCFO3A	HCFO4A	HCFO5A	HCFO6A
HCE13A	HCE14A	HCE15A	HCE16A	HCE17A	HCE18A
HCFOZ1	HCFOZ2	HCFOZ3	HCFOZ4	HCFOZ5	HCFOZ6

DS16   DS17   DS18   DS19   DS20   DS21

—————————————————— FUNCTIONAL OUTPUT ERROR ——————————————————

NOTE: LEGEND

MNEMONICS FOR SIGNALS FROM DATA COMMPARE LOGIC
MNEMONICS FOR SIGNALS TO ERROR DETECT LOGIC
MNEMONICS FOR SIGNALS FROM LAMP DRIVER LOGIC TO FRONT PANEL

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Figure 7-44. Relationship of Signal Mnemonics to Front Panel Error Lamps

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FROM
FRONT
PANEL
(FO-24)

MTS PWR SUP FLT XDS03 - HBLFTA6
DISPLAY RESET SO1 - WBDLTA6
SELF TEST SO3 - HBCSTD6
CONT CYCLE SO4 - WBCLTA6
RPT CYCLE SO5 - HBJRCD6

FROM
ERROR
DETECT
LOGIC
(7-42)

GO XDS01 - HBJASD6
NO GO XDS02 - HBJAQD6

(25 LINES)

TO FRONT
PANEL
(FO-24)

FROM
LAMP
DRIVER
LOGIC
(7-43)

CONT ERR - XDS04 TO XDS09-
HCCFZ1 TO HCCFZ6
FUNCT IN ERR XDS10 TO XDS15 -
ACFIZ1 TO HCFIZ6
FUNCT OUT ERR XDS16 TO XDS21 -
HCFOZ1 TO HCFOZ6

(25 LINES)

RED
PROBE
HBJAPOV

GREEN
PROBE
HBJAROV

FROM
ERROR
DETECT
LOGIC
(7-42)

PROBE
GO/NO GO
LAMP
DRIVERS

NO GO
HCJAPD6

GO
HCJARD6

HCJARD6

HCJAPD6

TO PROBE
ASSEMBLY
(7-17)

FROM
FRONT
PANEL
(FO-24)

LAMP TEST
WBLTEA1

LAMP TEST
CIRCUIT
ISOLATION
NETWORKS

FROM MEMORY
"Y"ADDRESS
(7-21)

TEST PATTERN
Y-ADDRESS
HBMY1AV TO HBMY6AV (6 LINES)

MEMORY
Y ADDRESS
DRIVERS

ROM Y ADDRESS
HCADOO TO HCAD50 (6 LINES)

TO TEST
PATTERN
MEMORY
(7-25)

PULLDOWN
HAGN50V
HAGN60V (2 LINES)

TO CIRCUIT MASK
MEMORY CONTROL
(7-27)

PULLDOWN
HBGN10V

PULLDOWN
HBGN20V

TO CARD
ID DECODE
FOR CLOCK
INSERTION
(7-37)

TO STATE
LOGIC
(7-9)

TO CLOCK
AND
TIMING
(7-15)
AND
SELF TEST
LOGIC
(7-47)

PULLDOWN
LOGIC
DRIVERS

+5V

PULLDOWN
HBGN30V

PULLDOWN
HBGN40V

TO MEMORY
"Y"ADDRESS
(7-21)

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Figure 7-45. Lamp Test Logic Block Diagram
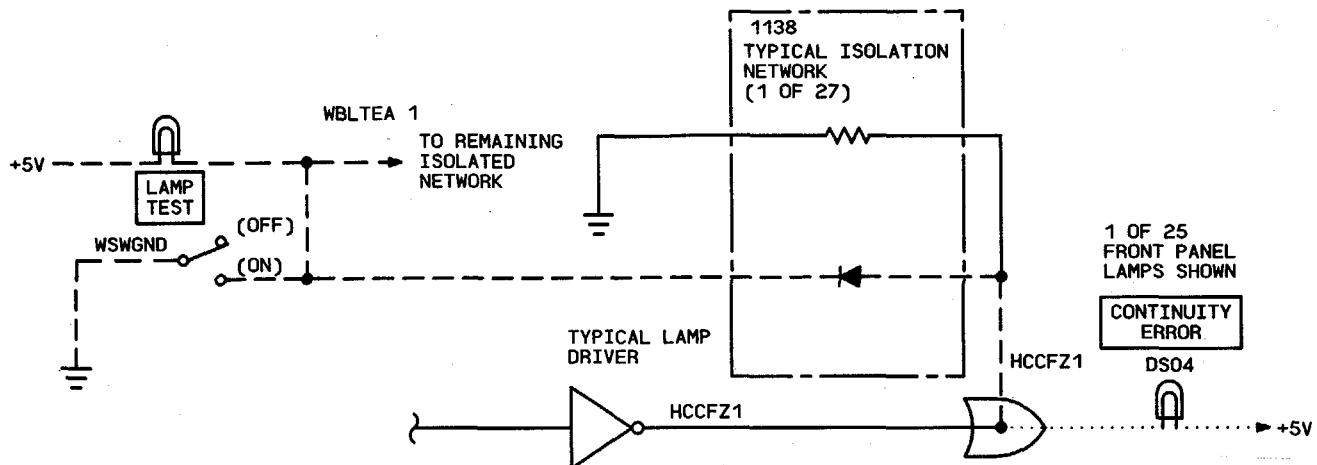
NOTES:
1. DASHED LINES INDICATE LAMP TEST SIGNAL PATH
   (WITH LAMP TEST SWITCH CLOSED)
2. SOLID LINES INDICATE NORMAL OPERATION SIGNAL
   PATH
3. DOTTED LINE INDICATES PATH COMMON
   TO LAMP TEST AND NORMAL OPERATION

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Figure 7-46. Typical Lamp Test Circuit Simplified Schematic

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Thus, a wire-OR function is performed so that either the normal lamp driver output or the lamp test input will light an associated lamp. Since signal WBLTEA1 is common to all isolation networks, all lamps will light when the SELF-TEST switch is on. Refer to table 7-20 for a summary of all indicators and related signals applicable to self-test.

b. Probe Lamp Drivers big. 7-45). The red probe (HBJAPOV) and green probe (HBJAROV) inputs are applied to lamp drivers. Outputs NO-GO (HCJAPD6) and GO (HCJARD6) are fed into the lamp test isolation networks and also to the probe assembly (HBJAPD6 and HBJARD6). The operation for lamp test is as described previously.

c. Miscellaneous Drivers. One of two sets of drivers is used for the six ROM Y address outputs (HCADOO to HCAD50). The second set of drivers produces pulldown signals (HAGN50V, HAGN60V and HBGNIOV to HBGN40V). Pulldown levels are used throughout the MTS logic for such functions as present-inputs to parallel-load counters.

7-31. MTS Interface. Refer to Volume 1, table 3-5, for information on MTS interface card location. Refer to key signal lookup tables in Volume 2 for signal distribution of signal names appearing on FO-27 of Volume 3.

7-32. Self-Test Logic (fig. 7-47). Self-test logic is on pcbs located in the left-hand and right-hand card cages of the MTS. The function of this logic is to determine whether or not an error has occurred during a self-test operation. A self-test error indicates that a hardware malfunction has been detected in the MTS logic exercised by way of self-test control.

a. Self-Test Control Logic. The purpose of this logic is to initiate the basic control signals used to sequence the self-test logic through its operations, based on the following general considerations:

(1) When the probe assembly is connected to the self-test terminal strip, a self-test start signal (HBCR2Q) is generated. This signal is unique to self-test. It is a function of the card ID decoder, card to binary logic, and other related logic used to signify that a modified MTS operation (ie, self-test) is being activated rather than actual CUT operation.

(2) The operation of the MTS then enters into a mode of operation nearly identical to an actual CUT operation. The primary difference for self-test is that the card ID signals are generated by a counter in the card-to-binary logic function. The card ID signals (HBCI05B1 to HBCI5B1) are simulated codes that substitute for CUT ID codes. The overall sequence of self-test timing involves: simulating each card ID; testing all resultant test pattern codes; examining each test pattern to determine if it is correct; and generating go or no-go indications, depending on the comparisons of

actual versus predicted test pattern data. If an error occurs, the MTS enters into a test loop for the associated dummy card ID.

(3) MTS self-testing progresses from state 1 thru state 6 as per normal CUT operation. When state 7 occurs and the timing generator starts operating, the next signal to occur that affects the self-test logic is signal (T5.T6*)*, (HBTE7A). (See figure 7-48.) A low HBTE7A pulse is transferred through Bating that develops 2-MHz clock A and 2-MHz clock B. and is also output from the 72 clock-pulse generator as the first pulse (HBCGFAV) preceding the actual 72 clock pulses (to be discussed in more detail later). This first pulse forms a clock pulse to load a 72-bit shift register with the 72-bit test pattern and circuit mask parallel data (HADAAO to HADAUO, HADBAO to HADBWO, HADCAO to HADCZO, and HADDAO to HADDEO). The load self-test pattern signal (HBCGDAV) is low to enable the parallel inputs, while shift self-test pattern (HBCGEAU) is high to inhibit serial shifting.

(4) The next signal to occur is signal (T1.T7)*, (HBTE1A). This pulse causes self-test on=H (HBCCTQ) to go high, and self-test on=L (HBCCTP) to go low. These signals provide the primary control to enable the remaining functions of the self-test logic. In addition, HBCCTP is applied to the clock and timing function to inhibit the timing generator from proceeding to the next time slot, (T3 T4), until the self-test comparison is completed.

b. 72-Clock-Pulse Generator. When HBCCTQ goes high, it also enables 2-MHz clock A and B signals (HBCG20 and HBCGFO). The 72 clock-pulse generator then produces a pulse train of 72 clocks (HBCGFAV) for the 72-bit test pattern shift register. When the 72nd pulse occurs, signal 72 shift complete * (HBCGCA) is enabled and resets the self-test control logic to the following conditions:

(1) HBCG20 and HBCGFO are disabled.
(2) HBCCTQ goes low.
(3) HBCCTP goes high (also enabling the timing generator again).
(4) HBCGDAV goes low.
(5) HBCGEAV goes high.

The pullups (SPI014 to SPI018) and pull downs (HBGNIOV,HBGN30V) are used as preset values prior to enabling of the 72 clock-pulse generator. Signal HBCGCA represents a terminal count occurring after the timing generator has produced the 72 clock pulses, starting from a predetermined and preloaded value. The clock pulse generator reset (HBFBKAV)is used to clear the pulse generator to zero.

c. 72-Bit Test Pattern Shift Register. The data loaded into the shift register represents test pattern memory information. This information, loaded in parallel prior to enabling the 72 clock-pulse generator, will be

Table 7-20. Lamp Test Signals for Related Indicators

Indicator	Reference Designator	Mnemonic Signal
Front Panel		
GO	XDS01	HBJASD6
NO-GO	XDS02	HBJAQD6
MTS PWR SUP FAULT	XDS03	HBCFTA6 (SEE NOTE)
DISPLAY RESET	S01	WBDLTA6
CONTINUITY ERROR (6)	XDS04-09	HCCFZ1-Z6
FUNCTIONAL INPUT ERROR (6)	XDS10-15	HCFIZ1-Z6
FUNCTIONAL OUTPUT ERROR (6)	XDS16-21	HCFOZ1-Z6
CONTINUOUS CYCLE	S04	WBCLTA6
REPEAT CYCLE	S05	HBJRCD6
SELF-TEST	S03	HBCSTD6
LAMP TEST	S01	WBLTEA1
Probe		
Green (GO)	DS1	HBJARD6
Red (NO-GO)	DS2	HBJAPD6

NOTE

Internal dc/dc converter lamps are also tested by the LAMP TEST switch.

DC/DC converter		
PSI and PS2		
EXT	---	HBLFTA6
INT	---	HBLFTA6

converted from parallel to serial data out (HAT183E). HBCGDAV enables parallel data loading and HBCFEAV enables the 72-bit serial shifting. Pulldown (HAGN60V) is used as a serial-input disable for the first stage of the shift register. Consequently, when the shift register goes from a parallel load into serial shift, logic zeroes will load serially into the lab register. Additionally, any ones that had been loaded will be shifted out and lost after 72 clock pulses.

d. Self-Test Pattern Check Sum Logic. This logic receives HAT183E and related control signals to generate an 8-bit test pattern check sum (HBT19OE to HBT193E, and HBT200E to HBT203E). The following control conditions apply to the operation of producing a check sum:

(1) The logic is initialized to zero, prior to receiving serial data (HAT183E), by state 3 (HBST3P), and a combination of HBCCTP high (not in self-test state 7 yet) and pulldowns (HBGN1OV to HBGN40V).

(2) When state 7 occurs (HBST7Q), HAT183E data starts shifting out, and the check sum logic becomes enabled. This is conditional on signal function test comparator gate 1 (HAFTBP) being high (test not yet completed).

(3) Once enabled, 2-MHz clock C (HBCS2A) is used as part of the logic to clock serial data into the check sum logic. The timing of HBCS2A is such that it leads the clocking of the 72-bit shift register, so that the check sum logic senses serial data prior to its transition times.

(4) HAT183E consists of a serial stream of logic ones that appear in a random manner. (See figure 7-49.) The check sum logic operates on a principle where the appearance of a logic one in the serial stream constitutes a clock pulse to an 8-bit gray code counter. Consequently, only logic ones are counted and are reflected as the 8-bit test pattern check sum in any one of 16 possible bit-configurations (see truth table of figure 7-49). If a hardware malfunction does exist, one or more bits may be added (or lost) in the serial stream. Therefore, after 72 clock pulses have occurred, the check sum logic should reflect some predetermined value if all the exercised MTS logic is operating properly. The outputs comprise one set of signals used for the comparator and error detection logic.

e. Card ID Check Sum Conversion ROM. The purpose of this logic function is to produce an 8-bit card ID check sum output (HBT211V1 to HBT218V1) that is related to the 6-bit CUT or self-test card ID input (HBCIOB1 to HBCISB1). The 8-bit output represents the predicted check sum output that should match up with the actual test pattern check sum output. These output are the second group used by the comparator and error detection logic.

f. Comparator and Error Detection Logic. This logic group operates under control of test complete latch 2 (HBCWAOV) and self-test start (HBCR2Q). Both signals must be high to partly enable the error detection logic only during active self-test operation. The final enabling condition for a self-test error * output (HBSAJA) is dependent on a comparison operation. The comparator checks for matches between the test pattern check sum and card ID check sum. As noted previously, both check sums should match. If they do not, an error condition is generated for the error detect logic. This would result directly in lighting the NO GO lamp and turning off the GO lamp on the front panel. An example is shown in figure 7-50 of an error condition. In this example, bit HBT192E should have been a logic one as predicted by HBT213V1. A hardware failure has occurred causing this fault condition. It is noted that 28 PC boards are testable, and only 16 check-sum combinations are possible. The same number of logic ones may appear in test patterns for different card types.

7-236
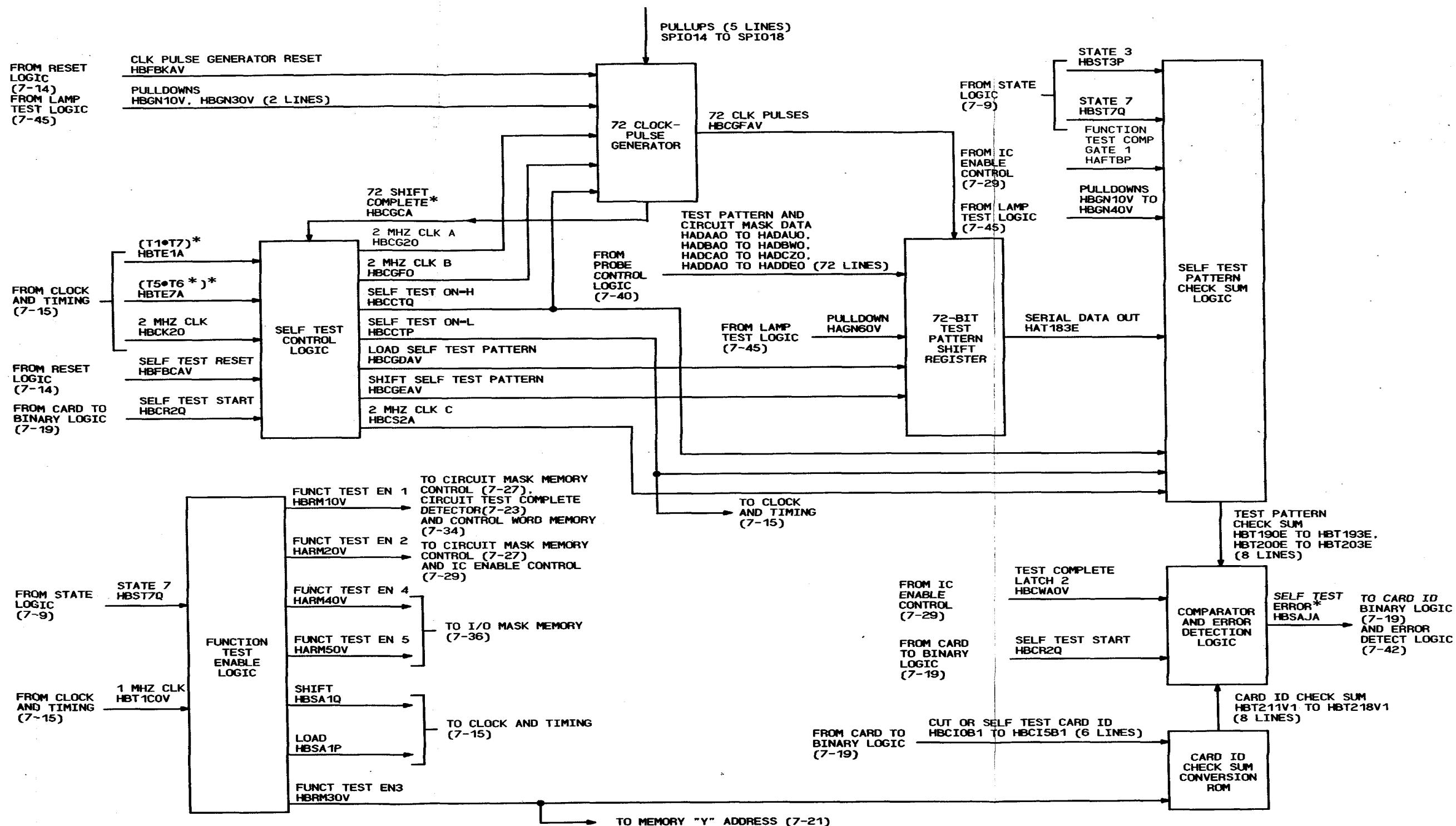
Figure 7-47. Self-Test Logic Functional Block Diagram

MS 428259

STATE 7

0 5 μS

HBCK20 — 2 MHZ CLK

HBCR2Q — SELF TEST START

INITIATES SELF TEST

HBTE7A — (T5•T6*)*

HBTE1A — (T1•T7)*

HBCCTQ — SELF TEST ON-H

HBCS2A — 2 MHZ CLK C

HBCGFO AND HBCG2O — 2 MHZ CLK A AND CLK B

HBCGCA — 72 SHIFT COMPLETE *

CLOCK PARALLEL DATA INTO 72-BIT SHIFT REGISTER

72 CLOCK PULSES

HBCGFAV — 72 CLK PULSES

HBCCTP — SELF TEST ON-L

ENABLE PARALLEL LOAD 72-BIT SHIFT REGISTER

HBCGDAV — LOAD SELF TEST PATTERN

ENABLE SERIAL SHIFTING OF 72-BIT REGISTER

HBCGEAV — SHIFT SELF TEST PATTERN

MS 428260

Figure 7-48. Self-Test Control Logic and 72 Clock-Pulse Generator Timing Diagram

7-239/(7-240 blank)
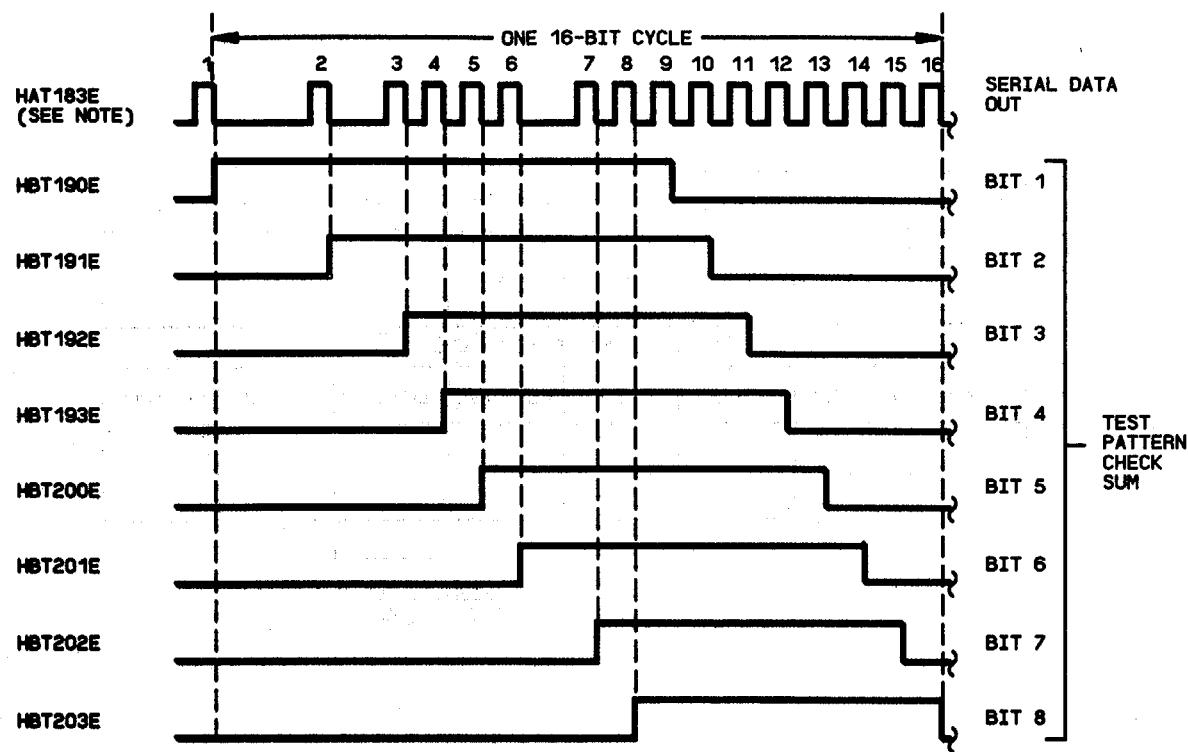
SERIAL DATA BIT NO.	TEST PATTERN CHECK SUM BIT NO.							
	8	7	6	5	4	3	2	1
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	1	1
3	0	0	0	0	0	1	1	1
4	0	0	0	0	1	1	1	1
5	0	0	0	1	1	1	1	1
6	0	0	1	1	1	1	1	1
7	0	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	0
10	1	1	1	1	1	1	0	0
11	1	1	1	1	1	0	0	0
12	1	1	1	1	0	0	0	0
13	1	1	1	0	0	0	0	0
14	1	1	0	0	0	0	0	0
15	1	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0

16-BIT CYCLE REPEATS

NOTE:

HAT183E SEQUENCE SHOWN IS INTENDED ONLY FOR EXAMPLE.

MS 428261

Figure 7-49. Self-Test Pattern Check Sum Timing Diagram and Truth Table

ACTUAL TEST PATTERN CHECK SUM

HBT203E	HBT202E	HBT201E	HBT200E	HBT193E	HBT192E	HBT191E	HBT190E
1	1	1	1	1	0	0	0

PREDICTED TEST PATTERN CHECK SUM

FUNCTION
OF CARD
ID

HBT218V1	HBT217V1	HBT216V1	HBT215V1	HBT214V1	HBT213V1	HBT212V1	HBT211V1
1	1	1	1	1	1	0	0

MISMATCH=SELF-TEST
ERROR *(HBSAJA)

MS 428282

Figure 7-50. Self-Test Error Example

SECTION IV. POWER DISTRIBUTION

7-33. Power Distribution (fig. 7-51). The dc operating power for the MTS is provided by a pair of dc/dc converters: PSI and PS2. Primary input power to the MTS and to the dc/dc converters consists of + 135v and -135v, supplied from the power cabinet. When the primary power is available, the two dc/dc converters will be energized when POWER ON switch S6 is pressed to ON at the MTS front panel. For converter PS1, the logic/auxiliary common (HCG093) is applied through closed contacts of switch S6 to provide manual off/on (HCPS20N) control to turn converter PSI on. For converter PS2, HCG094 and HCP1ON perform a like function to turn converter PS2 on. Converter PSI provides +5v, +15v, and -15v. Converter PS2 provides +5v, -5v, and +12v. Distribution of do power from converters PSI and PS2 is shown in figure 7-50. In addition, a reference voltage regulator, located in A3 106 of the analog card cage, provides the following voltages for distribution within the analog card cage: -2v reference (HC+ 1VDC), +2v reference A (HC+ 2VDC), and +2v reference B (HC+2.0v).

NOTE: ▭ INDICATES EQUIPMENT MARKING
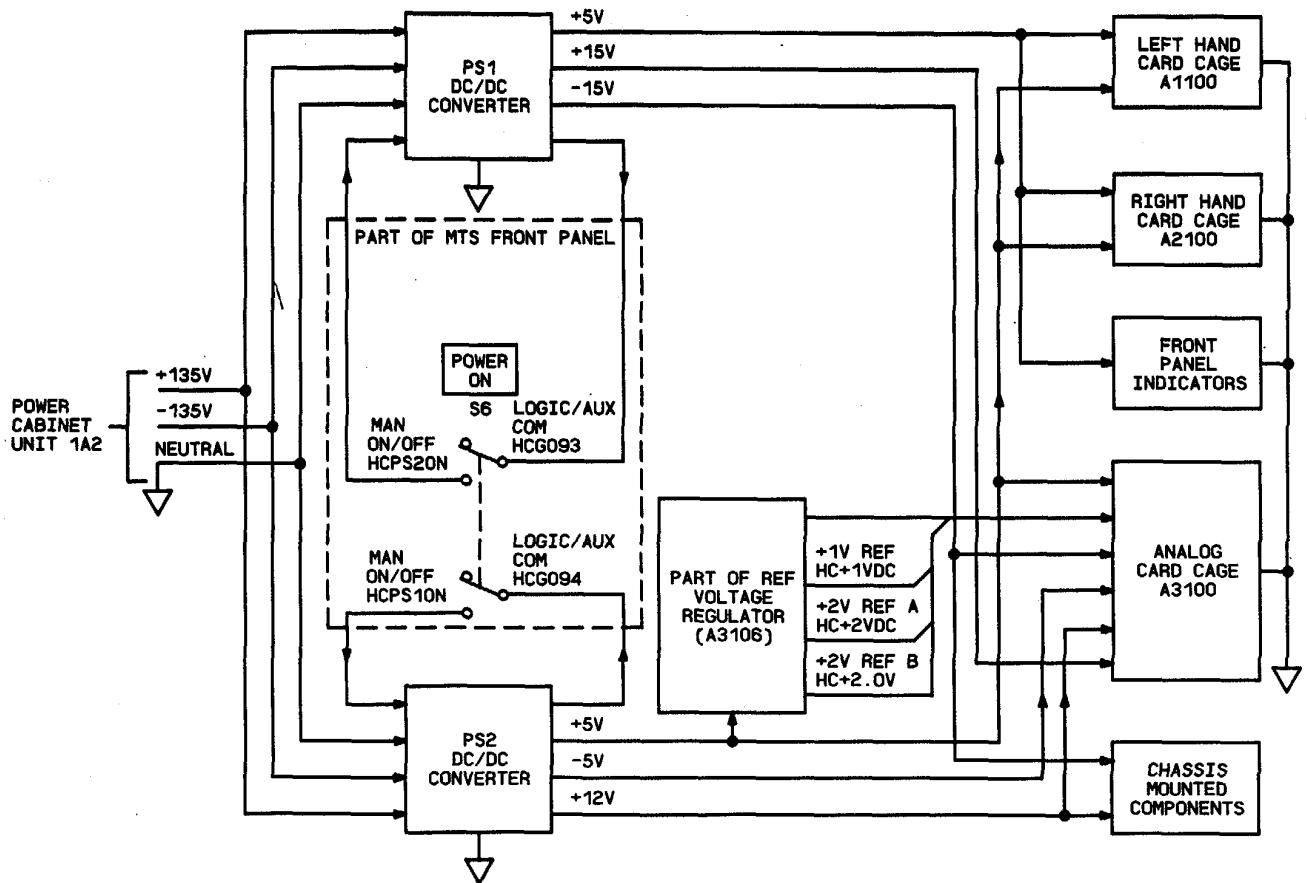
MS 428276

Figure 7-51. Power Distribution Block Diagram

7-243/(7-244 blank)

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$5/9(°F - 32) = °C$
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
$9/5C° + 32 = °F$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

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