

APPENDIX A

GLOSSARY OF RK05 BACKPLANE CONNECTIONS

+5 Vdc	Logic power for positive 5 volts is available on any AA2 pins or BA2 pins, all of which are bussed together.
+15 Vdc	Logic power for positive 15 volts is available on the first 6 AD2 pins and the first 6 BD2 pins, which are bussed together.
-15 Vdc	Logic power for negative 15 volts is available on the first 6 AB2 pins and the first 6 BB2 pins, which are bussed together.
GND	Ground is available on any AC2, BC2, AT1, or BT1 pins.
+5 Vdc Bulb	Positive 5 volts used in the Linear Encoder Lamp is available on pin B6A1, which is tied to B6A2.
+15 Vdc Control Panel	Positive 15 volts used in the control panel is available on pin A6D1, which is tied to A5D2.
+COS POSITION TP5	A sinusoidal signal will be present at this test point while the carriage is in motion.
+SIN POSITION	A sinusoidal signal developed by the linear transducer while the carriage assembly is in motion. Minimum absolute value, which corresponds to zero degrees, is used by the detent logic to lock the carriage in place at the correct cylinder.
+SIN POSITION TP2	A sinusoidal signal will be present at this test point while the carriage is in motion.
-COS POSITION	An inverted COS POSITION signal available from the linear transducer while the carriage is in motion.
-COS POSITION TP4	A sinusoidal signal will be present at this test point while the carriage is in motion.
-SIN POSITION TP3	A sinusoidal signal will be present at this test point while the carriage is in motion.

ADDRESS ACCEPTED	<p>A signal acknowledging receipt of a valid cylinder address (from the controller – 0–312 octal) which clocks:</p> <ol style="list-style-type: none"> 1. The octal difference between present and desired cylinders into the Difference Register flops. 2. The Forward and Reverse flops in an attempt to set or reset the appropriate one.
ADDRESS INVALID	A signal which indicates receipt of an invalid (greater than 312 octal) cylinder address.
CLK KILL TP	Grounding this test point will stop the slow clock. (Used on module tester only.)
COUNT PULSE FWD	<p>A signal which, once per cylinder:</p> <ol style="list-style-type: none"> 1. Increments the current address register during forward carriage motion. 2. Clocks the Forward, Reverse and Difference Register flops when going reverse.
COUNT PULSE REV	<p>A signal which, once per cylinder:</p> <ol style="list-style-type: none"> 1. Decrements the current address register during reverse carriage motion. 2. Clocks the Forward, Reverse and Difference Register flops when going forward.
CYL 128	A signal that when true indicates a current address greater than 177 octal. The read/write logic will decrease write current when this signal is present.
DIFF (1–16)	<p>Difference Register flops which are:</p> <ol style="list-style-type: none"> 1. Reset to indicate maximum velocity 2. Set to indicate minimum velocity 3. Clocked once per cylinder to contain the difference between the present and desired cylinders.
DOOR UNLOCKING SOLENOID L	A signal required to electrically unlock the cartridge receiver door. This signal and an accompanying “clank” normally occur about one-half minute after the RUN/LOAD switch has been placed in the LOAD position when the drive has been cycled up.
	<p>CAUTION</p> <p>Do <i>not</i> open the door if the “clank” occurred two or three seconds after placing the switch in LOAD. <i>Severe</i> damage will occur. However, after the disk has come to a stop, try to determine why the door unlocked prematurely.</p>
BUS AC LO	<ol style="list-style-type: none"> 1. Safety relay K2 is de-energized, or 2. The ac from the power supply is at an incorrect level.

BUS ADDRESS ACCEPTED	A signal sent to the controller acknowledging receipt of a valid cylinder address.
BUS CYL ADD (0–7)	Octally encoded signals from the controller indicating the cylinder to be used.
BUS DC LO	<ol style="list-style-type: none"> 1. Safety relay K2 is de-energized, or 2. The +15 Vdc is at an incorrect level 3. The -15 Vdc is at an incorrect level 4. The +5 Vdc is at an incorrect level.
BUS FILE RDY	<p>A signal indicating that the selected drive:</p> <ol style="list-style-type: none"> 1. Has its heads loaded 2. Has its fault latch reset 3. Has been selected (addressed) by the controller.
BUS INDX PLS	Index pulses (40 ms repetition rate) from the selected drive for the controller.
BUS ADDRESS INVALID	The ADDRESS INVALID signal is used to acknowledge receipt of an invalid (greater than 312 octal) cylinder address.
BUS R/W/S RDY	A signal indicating that the selected drive is positioned at the desired cylinder.
BUS RD CLK	The serial clock and data pulse stream read from the disk is separated on the G180 Read/Write module. The clock signals called “BUS RD CLK L” are used by the controller.
BUS RD DATA	The serial clock and data pulse stream read from the disk is separated on the G180 Read/Write module. The data signals called “BUS RD DATA L” are used by the controller.
BUS RD GATE	A controller signal indicating that read operation is in progress. This signal partially enables a gate to light the READ indicator.
BUS RESTORE	A controller signal used to initiate a carriage restore or RTZ.
BUS RK05	A signal used to indicate to the controller that the selected drive is an RK05 (high density).
BUS RK11-D	A controller signal indicating that an RK11-D controller is attached. This signal causes the select logic to respond to an octally encoded (0–7) drive number. A lack of this signal causes the select logic to respond to a positionally encoded (0–10) number, where each bit corresponds to a different drive.
BUS SEC CNTR (0–3)	These signals are an octally encoded sector count used by the controller.
BUS SEC PLS	Sector pulses from the selected drive for the controller.

BUS SEL DR (FOUR SIGNALS)	Positionally (one bit per drive) or octally encoded (0–2) controller signals used to select a desired drive.
BUS HEAD SELECT L	A controller signal used to select the upper head.
BUS SEEK INCOMPLETE	A signal sent to the controller to indicate that the selected drive: <ol style="list-style-type: none"> 1. Did not complete a seek in 280 ms 2. Detected inner limit.
BUS STROBE	A controller signal used to initiate: <ol style="list-style-type: none"> 1. Motion commands (Seek, Restore) 2. Responses (BUS ADDRESS ACCEPTED, ADDRESS ACCEPTED, BUS ADDRESS INVALID, AND ADDRESS INVALID).
BUS WT CHK	A signal sent to the controller to indicate: <ol style="list-style-type: none"> 1. +15 Vdc is abnormal 2. -15 Vdc is abnormal 3. +5 Vdc is abnormal 4. Fault latch is set 5. The heads are not loaded.
BUS WT DATA & CLK	The serial clock and data pulse stream sent (to the drive by the controller) to be written on the disk.
BUS WT GATE	A controller signal, indicating that write operation is in progress. This signal partially enables gates to: <ol style="list-style-type: none"> 1. Light the WRITE indicator 2. Enable the Write flop 3. Toggle the Write flop.
BUS WT PROT STATUS L	A signal used to indicate to the controller that the selected drive is write protected.
BUS WT PROTECT SET L	A controller signal used to set the Protect flop in the selected drive.

FAULT INDICATOR L	<p>A signal used to light the fault indicator if:</p> <ol style="list-style-type: none"> 1. +15 Vdc is abnormal 2. -15 Vdc is abnormal 3. +5 Vdc is abnormal 4. The fault latch is set 5. Drive is writing without a WT gate 6. Transducer light (linear encoder) is burnt out.
FORCE UNSAFE TP	<p>A test point which will be high when write or erase current is present. This signal partially enables a gate to set the fault latch.</p>
FWD	<p>A signal set when forward motion is desired. This signal is used by the Position Servo Preamp module to cause forward motion.</p>
GOOD STROBE	<p>A signal derived from BUS STROBE – used to initiate:</p> <ol style="list-style-type: none"> 1. Motion commands (Seek, Restore) 2. Responses (BUS ADDRESS ACCEPTED, ADDRESS ACCEPTED, BUS ADDRESS INVALID, AND ADDRESS INVALID).
HOME	<p>A signal which <i>should</i> be true only when the HOME switch is activated by the carriage in the HOME position.</p>
INDEX PULSES	<p>Pulses occurring at a 40 ms repetition rate when a drive has a cartridge inserted and its spindle motor turning at the correct speed.</p>
INDEX/SECTOR	<p>Combination of index and sector pulses.</p>
INNER LIMIT	<p>A signal caused by electronically sensing inner limit. This signal causes:</p> <ol style="list-style-type: none"> 1. RTZ (restore) to be set 2. Fault latch to be set.
INNER LIMIT H TP11	<p>A test point that will be high while inner limit is being sensed.</p>
INTERLOCK L	<p>A signal indicating that a path exists through the cartridge seated and the door locked switches to ground; i.e., the interlocks are closed, permitting normal drive operation.</p>
CHASSIS LIMIT	<p>A tri-level signal from the linear transducer to indicate general carriage positioning.</p> <ol style="list-style-type: none"> 1. Positive (5 mV) = outer limit 2. Negative (5 mV) = inner limit 3. Ground = somewhere in between.

LOAD HEADS L	This signal indicates a "Safe to Allow Heads to Become or Remain Loaded". It partially enables a gate to set the Forward and reset the Reverse flops. A lack of this signal will: <ol style="list-style-type: none"> 1. Set the Difference Register flops 2. Force Reverse true until home is sensed 3. Reset the start delay counter.
LOAD HEADS H	This signal indicates a "Safe to Allow Heads to Become or Remain Loaded". It is sampled by the Move flop once after each occurrence of both Forward and Reverse going false.
LOAD INDICATOR L	A signal that lights the LOAD INDICATOR light. It accompanies the electronic unlocking of the cartridge receiver door. This signal and an accompanying "clank" normally occur about one-half minute after the RUN/LOAD switch has been placed in the LOAD position when the drive has been cycled up.
<p>CAUTION</p> <p>Do <i>not</i> open the door if the "clank" occurred two or three seconds after placing the switch in LOAD. <i>Severe damage will occur.</i></p>	
LOAD SW	Resets the run latch.
MOVE	A signal indicating the presence of either Forward or Reverse.
ON	A signal indicating the presence of +5 Vdc on the index and sector module. A lack of it will force an immediate reset of the Forward flop.
OUTER LIMIT	A signal caused by electronically sensing outer limit. This signal causes: <ol style="list-style-type: none"> 1. A gate to reset Reverse and set the Forward flop if the heads are loaded 2. Restore flop to be set 3. Outer limit extend latch to be set 4. Address registers to be held cleared. <p>A lack of outer limit will:</p> <ol style="list-style-type: none"> 1. Partially enable a gate to reset the outer limit extend latch 2. Enables a gate to set the fault latch if home is sensed.
OUTER LIMIT H TP10	A test point that will be high while outer limit is being sensed.
PROTECT H	A flop set to indicate that the drive is write-protected.
PWR AMP DR	An analog signal generated on the Position Servo Preamp module. It is used as the input to the Servo Position Power Amp to control direction and velocity of carriage motion.

PWR SEC XDUCER	Power for the sector transducer provided by the index and sector module.
R/W/S RDY L	A signal indicating no carriage motion desired (Forward and Reverse false) which: <ol style="list-style-type: none"> 1. Resets the seek incomplete counter 2. Partially enables a gate to allow the Write flop to toggle.
R/W/S RDY H	A signal indicating no carriage motion desired (Forward and Reverse false) which: <ol style="list-style-type: none"> 1. Resets the strobe delay (unless RTZ becomes true) 2. Partially enables a gate to cause BUS R/W/S RDY 3. Partially enables a gate to cause the SEEK DONE indicator to light 4. Partially enables a gate to reset the outer limit extend latch.
READ INDICATOR L	This signal is true to light the READ indicator while the selected drive is in read operation.
READY	This signal indicates that the heads are loaded and the drive is ready.
READY INDICATOR L	This signal lights the READY indicator as long as the READY flop is set.
RESTORE	A signal derived from BUS RESTORE that: <ol style="list-style-type: none"> 1. Partially enables a gate to reset the fault latch 2. Conditions the RTZ flop.
REV	A signal set when reverse motion is desired. This signal is used by the Position Servo Preamp module to cause reverse motion.
RTZ	A signal that: <ol style="list-style-type: none"> 1. Clears the address registers 2. Sets the Reverse flop.
RUN SW	Sets the run latch.
SAFETY RELAY L	This signal energizes the safety relay when the logic voltages are OK. However, the diode used to minimize the effect of inductive kick can provide a path to energize the relay. It is via the power indicator in the control panel. The cause would be an open in the +15 Vdc line from J1 of the H743 Power Supply and A1D2 of the logic backpanel.
SECTOR PULSES	Pulses occurring at a 3.3 ms repetition rate when a drive has a cartridge inserted and its spindle motor turning.
SECTOR/INDEX RAW L	Pulses produced by the sector transducer while the cartridge is spinning.

SEEK DONE INDICATOR L	<p>A signal used to light the ON CYLINDER light when:</p> <ol style="list-style-type: none"> 1. The READY flop is set (heads loaded) 2. There is no carriage motion desired (Forward and Reverse false).
SELECT	<p>A signal indicating that "this" drive has been selected for use by the controller which:</p> <ol style="list-style-type: none"> 1. Indicates (via BUS RK05/HIGH DENSITY L) that a high density drive is responding. 2. Partially enables some response gates (BUS FILE READY L, BUS WT CHK L, BUS WT PROT STATUS L).
SELECT/READY	<p>A signal indicating that the selected drive has its heads loaded and fault latch reset, which partially enables gates to:</p> <ol style="list-style-type: none"> 1. Toggle the Write flop 2. Enable the strobe delay logic 3. Produce responses – BUS RD DATA L, BUS RD CLK L, BUS SEC CNTR (0–3) L, BUS R/W/S RDY L, BUS SEEK INCOMPLETE L.
SELECT/WRITE PROTECT SET	<p>A signal derived from the controller's BUS WT PROTECT which sets the Protect flop.</p>
SELECTED READ GATE	<p>A signal derived from SELECT/READY and BUS RD GATE to partially enable BUS RD DATA L and BUS RD CLK L. This signal causes READ INDICATOR L, which lights the READ indicator during read operation.</p>
SELECTED WT GATE	<p>This signal partially enables gates to:</p> <ol style="list-style-type: none"> 1. Toggle the Write flop 2. Produce WRITE INDICATOR L which lights the WRITE indicator during write operation.
SET UNSAFE	<p>A signal indicating unsafe operation (write or erase current but no BUS WT gate) that sets the fault latch.</p>
SPINDLE MOTOR RELAY L	<p>This signal energizes the spindle motor relay when the spindle motor latch is set. However, the diode used to minimize the effect of inductive kick can provide a path to energize the relay. It is via the power indicator in the control panel. The cause would be an open in the +15 Vdc line from J1 of the H743 Power Supply and A1D2 of the logic backpanel.</p>
TP1	<p>This test point on the Position Servo Preamp module can be used to monitor the analog velocity generator output.</p>
TP6	<p>This test point on the Position Servo Preamp module can be used to monitor the lagging square wave signals derived from SIN POSITION and inverted (-) COS POSITION signals.</p>

TP7	This test point on the Position Servo Preamp module can be used to monitor the leading square wave signals derived from SIN POSITION and COS POSITION signals.
TP9	This test point on the Position Servo Preamp module can be used to monitor the DETENT signal (sum of SIN POSITION and velocity).
TP12	This test point on the Position Servo Preamp module can be used to monitor the inverted analog velocity generator output (used for forward motion).
UNSAFE	A signal used to deselect both heads if: <ol style="list-style-type: none"> 1. +15 Vdc is abnormal 2. -15 Vdc is abnormal 3. +5 Vdc is abnormal 4. Fault latch is set 5. The heads are unloaded.
VELOCITY TP8	This analog signal is the output of the electronic (no mechanical measuring) tachometer. The test point is on the Position Servo Preamp module.
WRITE INDICATOR L	This signal is true to light the WRITE indicator while the selected drive is in write operation.
WRITE PROTECT INDICATOR L	A signal used to light the PROTECT indicator while the PROTECT flop is set.
WRITE SW ON L	N/O contact of the control panel write protect switch which will be true only while the switch is held depressed. It will: <ol style="list-style-type: none"> 1. Set the protect toggle latch 2. Toggle the Protect flop 3. Reset the fault latch.
WRITE SW OFF L	N/C contact of the control panel write protect switch which will be true only while the switch is <i>not</i> being depressed. It will: <ol style="list-style-type: none"> 1. Reset the protect toggle latch 2. Partially enable the fault latch.