

RQDXn J1/ M9058 J12 Connector Signals

MFM WR DT1 (H) (RD only)	1	These differential pairs will be used to transmit data to be written to the hard disk surface, when the Write Gate signal is asserted. There are two sets of these pairs, to allow two hard drives to be connected without external logic. Both sets will be active at the same time. <i>A third and fourth set are derived from the RX WR DATA signal, gated with DRVSEL1 and DRVSEL2.</i>
MFM WR DT1 (L) (RD only)	2	Differential pair with MFM WR DT1 (H) - pin 1.
GROUND	3	Signal ground and 0V connection.
HEAD SEL 2 (L) (RD only)	4	Head select signal 2 ² to hard drive(s), decoded by the drive to select one of sixteen heads/surfaces.
GROUND	5	
SEEK CPLT (L) (RD only)	6	This input should be asserted when the currently-selected hard disk drive has completed a seek function.
DRV 4 RDY (H) RD only)	7	When asserted by the front panel (READY switch open), the controller assumes the hard disk on DRV SEL 4 is ready. When the controller performs a seek, it forces this signal low to turn off the READY LED. <i>Normally used for RD1. Not gated with any other signal.</i>
WRT FAULT (L)	8	For hard disc drives, this should be asserted when a condition exists in a selected drive which should cause writing to be inhibited. The signal should remain asserted until the error condition is corrected and/or the drive is de-selected. Some of these conditions include: write current without write gate; write gate without write current; multiple heads/no head/ improperly-selected head; DC voltage out of tolerance; write gate asserted while seek complete is de-asserted. For floppy drives, this signal should be asserted when a write-protected diskette is present.
HEAD SEL 3 (L) (RD only)	9	Head select signal 2 ³ to hard drive(s), decoded by the drive to select one of sixteen heads/surfaces. <i>On RQDX1 and RQDX2, this is used as DRV BUS OE (L) input to RQDX1/2. It is connected to ground on the M9058, to enable the RQDX1/2 outputs.</i>
HEAD SEL 1 (L) (RD only)	10	Head select signal 2 ¹ to hard drive(s), decoded by the drive to select one of sixteen heads/surfaces.
DRV 1 RDY (H) (RD only)	11	When asserted by the front panel (READY switch open), the controller assumes the hard disk on DRV SEL 1 is ready. When the controller performs a seek, it forces this signal low to turn off the READY LED. <i>On RQDX1, this is RX0 Write-Protect LED. DRV SEL 1 is normally used for an RX50 or RD2.</i>
DRV 3 RDY (H) (RD only)	12	When asserted by the front panel (READY switch open), the controller assumes the hard disk on DRV SEL 3 is ready. When the controller performs a seek, it forces this signal low to turn off the READY LED. <i>Normally used for RD0.</i>
DRV 1 WPT LED (L)	13	This signal, when asserted from the front panel (Write Protect switch closed), is used to indicate to the controller that the disk on DRV SEL 1 is to be protected against write operations. The controller can assert this line to indicate that system software has write-protected the corresponding hard drive. <i>Normally used for RX50 (RX1 WPT LED on RQDX1), or RD2.</i>
DRV SEL 0 ACK (L) (RD only)	14	This input signal is asserted by a hard drive to indicate that it has been selected. When this signal (or DRV SEL 1 ACK - pin 44) is asserted, the controller will assume there is a hard drive connected to the currently active DRV SEL <1:4> line. <i>This line comes from the connectors normally used for RD0 and RD2.</i>
MFM RD DT0 (H) (RD only)	15	Data from the hard disk surface is transmitted to the controller on these differential pairs. The controller will assume that hard drives on DRV SEL 1 and DRV SEL 3 will transmit on MFM RD DT0, and drives on DRV SEL 2 and DRV SEL 4 will transmit on MFM RD DT1. <i>This signal (and its pair) is de-multiplexed from the two sets of signals from the connectors normally used for RD0 and RD2.</i>
MFM RD DT0 (L) (RD only)	16	Differential pair with MFM RD DT0 (H) - pin 15.

MFM WR DT0 (H) (RD only)	17	These differential pairs will be used to transmit data to be written to the hard disk surface, when the Write Gate signal is asserted. There are two sets of these pairs, to allow two hard drives to be connected without external logic. Both sets will be active at the same time. <i>A third and fourth set are derived from the RX WR DATA signal, gated with DRVSEL1 and DRVSEL2.</i>
MFM WR DT0 (L) (RD only)	18	Differential pair with MFM WR DT0 (H) - pin 17.
MFM RD DT1 (H) (RD only)	19	Data from the hard disk surface is transmitted to the controller on these differential pairs. The controller will assume that hard drives on DRV SEL 1 and DRV SEL 3 will transmit on MFM RD DT0, and drives on DRV SEL 2 and DRV SEL 4 will transmit on MFM RD DT1. <i>This signal (and its pair) is de-multiplexed from the two sets of signals from the connectors normally used for RD1 and RD3.</i>
MFM RD DT1 (L) (RD only)	20	Differential pair with MFM RD DT1 (H) - pin 19.
GROUND	21	
RED WRT I (L)	22	This controller output can be asserted to force a drive to use a low value of write current. <i>Connected to TRK43 (pin 2) on RX50 connector.</i>
DRV 3 WRT PROT (L) (RD only)	23	This signal, when asserted from the front panel (Write Protect switch closed), is used to indicate to the controller that the hard disk on DRV SEL 3 is to be protected against write operations. The controller can assert this line to indicate that system software has write-protected the corresponding hard drive. <i>Normally used for RD0.</i>
DRV SEL 4 (L)	24	The controller asserts this line to (exclusively) select one of four drives for operation. <i>Normally used for RD1. This signal is buffered and then connected to DS0 (pin 26) on J2 (ie RD1), and via a removable link to DS1,2, and 3 (pins 28,30, and 32).</i>
GROUND	25	
INDEX (L)	26	This input signal informs the controller that the currently-selected drive is at the beginning of a track.
DRV 4 WRT PROT (L) (RD only)	27	This signal, when asserted from the front panel (Write Protect switch closed), is used to indicate to the controller that the hard disk on DRV SEL 4 is to be protected against write operations. The controller can assert this line to indicate that system software has write-protected the corresponding hard drive. <i>Normally used for RD1.</i>
DRV SEL 1 (L)	28	The controller asserts this line to (exclusively) select one of four drives for operation. <i>Normally used for RX50 or RD2. This signal is buffered and then connected to DS0 (pin 26) on J3 (ie RD2), and via a removable link to DS1,2, and 3 (pins 28,30, and 32). DS0 (pin 10) on the RX50 connector can be connected to this line by a molex jumper.</i>
DRV SEL 2 (L)	29	The controller asserts this line to (exclusively) select one of four drives for operation. <i>Normally used for RX50 or RD3. This signal is buffered and then connected to DS0 (pin 26) on J4 (ie RD3), and via a removable link to DS1,2, and 3 (pins 28,30, and 32). DS1 (pin 12) on the RX50 controller is connected to this line, and it may also be connected to DS0 by a molex jumper.</i>
DRV SEL 3 (L)	30	The controller asserts this line to (exclusively) select one of four drives for operation. <i>Normally used for RD0. This signal is buffered and then connected to DS0 (pin 26) on J1 (ie RD0), and via a removable link to DS1,2, and 3 (pins 28,30, and 32).</i>
DRV 2 RDY (H)	31	When asserted by the front panel (READY switch open), the controller assumes the hard disk on DRV SEL 2 is ready. When the controller performs a seek, it forces this signal low to turn off the READY LED. <i>May be used for RD3, or for RX50 (second unit).</i>
RX MOTOR ON (L)	32	Asserted by the controller to turn on the floppy drive motor(s).
GROUND	33	

DIRECTION (L)	34	This signal controls the direction of head movement. When asserted (L), the direction of movement is toward the spindle (in).
GROUND	35	
STEP (L)	36	This output is used to step the head(s) of the currently-selected floppy drive or hard drive.
GROUND	37	
RX WRT DAT (RX only)	38	This output is the write data channel to the floppy drive(s). <i>It is also gated with DRV SEL 1 and DRV SEL 2 to generate differential MFM write data for RD2 and RD3.</i>
GROUND	39	
WRT GATE (L)	40	When asserted, this controller output will turn on the write drivers on the currently-selected drive. <i>The gating is to be done on the drive (as normal); the M9058 simply passes this signal on without using it.</i>
GROUND	41	
TRK 00 (L)	42	This input from the currently-selected hard drive or floppy drive will indicate that the drive's head(s) are positioned at track zero.
DRV 2 WPT (L)	43	This signal, when asserted from the front panel (Write Protect switch closed), is used to indicate to the controller that the hard disk on DRV SEL 2 is to be protected against write operations. The controller can assert this line to indicate that system software has write-protected the corresponding hard drive. <i>Normally used for RD3. Note: the RQDX1 documentation shows this as RX0 RDY (H).</i>
DRV SEL1 ACK (L)	44	This input signal is asserted by a hard drive to indicate that it has been selected. When this signal (or DRV SEL 0 ACK - pin 14) is asserted, the controller will assume there is a hard drive connected to the currently active DRV SEL <1:4> line. <i>This line comes from the connectors normally used for RD1 and RD3.</i>
GROUND	45	
RX RD DATA (L) (RX only)	46	This input is the read data channel from the floppy drive(s).
GROUND	47	
HEAD SEL 0 (L) (RD only)	48	Head select signal 2 ⁰ to hard drive(s), and is decoded by the drive to select one of sixteen heads/surfaces. <i>It also connects to the Side Select signal (pin 32) on RX50.</i>
GROUND	49	
READY	50	This signal, from the drive, indicates: <ul style="list-style-type: none"> - for hard drives, when SEEK CPLT is also asserted, the drive is ready to read, write, or seek - for floppy drives, the drive is selected, the door is closed, and media present.

Inconsistencies regarding the names/function of pins 7, 11, 12, 13, 23, 27,31, 43 are due to inconsistencies/incompleteness in the RQDX1 and RQDX3 documentation.

Note that all four WRT PRT (L) signals and all four DRV *n* RDY (H) signals are derived solely from the front panel, which connects directly to J9 and thence to J12 (the RQDX_{*n*}), with no connection to the drives themselves.

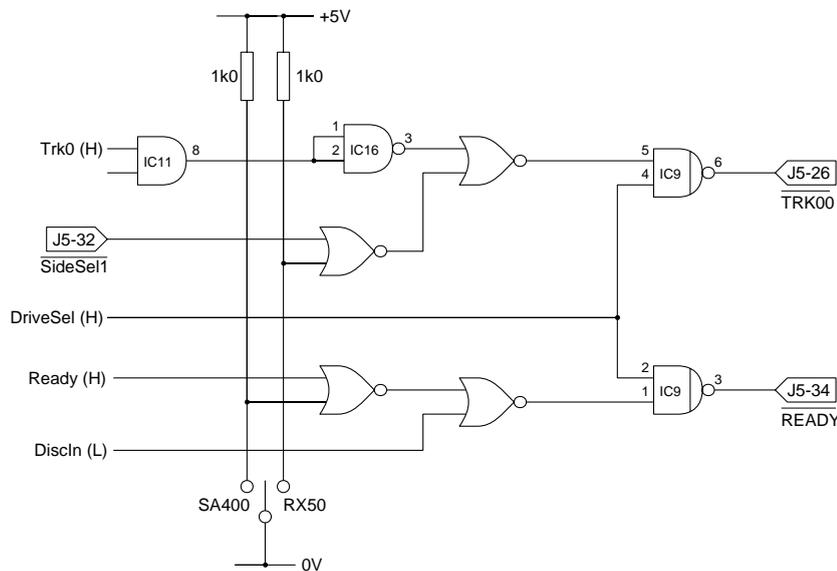
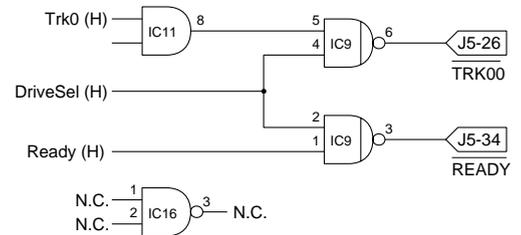
RX50 Floppy Disc Drive

The RX50 floppy drive differs from the SA400 standard in several respects:

- 1) The RX50 does not need nor use the InUse / HeadLoad signal on pin 4.
- 2) The RX50 will not respond to STEP pulses unless the drive is both selected, and MotorOn is valid; most SA400-compatible drives will step (if selected) regardless of MotorOn.
- 3) The RX50 is effectively two drives with a common spindle and carriage; thus any head movement on Drive 0 will also affect Drive 1.
- 4) The RX50 Ready signal (pin 34) indicates that the drive has a disk in, the door is closed, and is selected, regardless of whether the motor is running or not. On an SA400-compatible drive, this signal indicates that the drive has a disk in, is running at full speed (two consecutive index pulses at the correct time interval), and is selected. The inherent delay (minimum 200ms) prevents an RQDXn from seeing the drive as being ready.
- 5) On the RX50, which is a single-sided device, the SideSelect1 signal is used to disable the Track00 output; the RQDX series controllers use this as a test to determine that the drive really is an RX50 (and really is present).

The first three points are unimportant when using an SA400 drive on an RQDX controller in place of an RX50, but may in rare cases be significant if an RX50 is used on other systems. The latter two points must be catered for when using an SA400-type drive on an RQDXn controller. Ideally, this should include disk-in detection, but a simple derivation of the drive-select signal has been found to suffice if this is impractical. However, such a "fudge" will cause an RQDXn controller to think a disk is present even if there is not, and any attempt to access the non-existent disk will generate a "Disk Fault" or "Drive Fault" type of error instead of a "No Disk" or "Drive Empty" type of error.

A Canon MD220 drive can be modified to behave as an RX50 (actually, half an RX50) by adding a 74LS02 IC with some minor modifications. The diagram on the right shows the original version of the original circuit; the diagram below shows the modified version. The switch allows the drive to be used either as an RX50, or exactly as it was before.



Trk0(H) taken from IC11-8
 SideSel(L) taken from IC06-9
 Ready(H) taken from a plated-through hole under IC12
 DiscIn(L) taken from a plated-through hole by RA2

The DiscIn(L) signal was originally the DoorClosed(L) signal. The door microswitch was disconnected, and a new microswitch fitted beside the head load solenoid to sense the disk. The drive design is such that this is only effective if the door is closed.

Where it is not possible to provide a DiscIn signal, a simpler circuit will be effective, subject to the note about disk/drive errors mentioned above. This circuit, using an additional 7438, has been used with a Mitsubishi 4853.

