

CHAPTER FOUR

# Special Features

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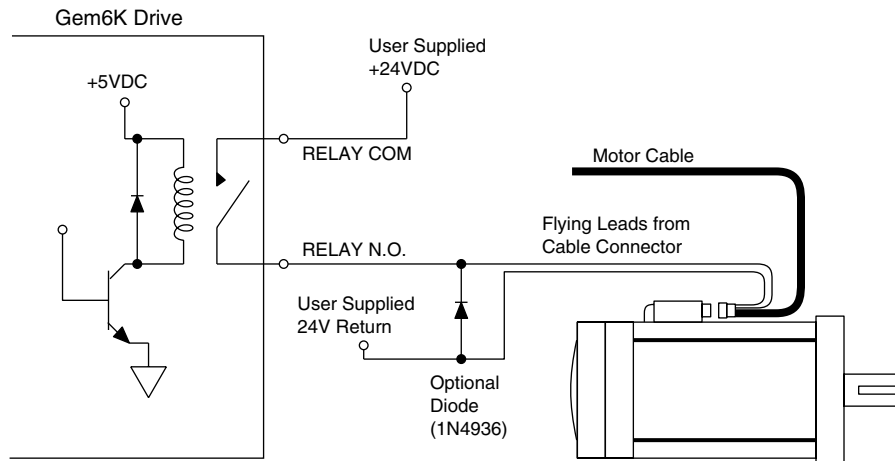
## IN THIS CHAPTER

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- Relay Connections
- Multiple Drive Installations
- V BUS $\pm$  (GV6K Only)
- Regeneration and the GPDM (GV6K Only)
- Aligning the Resolver (GV6K Only)
- RS-232/485 and Ethernet Communications
- RP240, Master Encoder, and Expansion I/O
- Updating the Drive's Operating System

## Relay Connections (optional)

To use the Gem6K's internal relay, connect your external circuit to the RELAY COM and RELAY N.O. terminals. The next drawing shows a typical application—connecting a motor brake to the relay terminals.



### Relay Connections

The relay is normally open. When the drive is enabled, it holds the relay closed. If the drive faults or is disabled, the relay will open.

### Relay Operation:

#### Drive Condition:

Enabled  
 Faulted  
 No AC power\*, or not enabled

#### Relay State:

Closed  
 Open  
 Open

\* +24VDC power does not affect the relay. With +24VDC applied, the relay will be open if AC power is *not* applied.

### Relay Specifications:

#### Relay Type:

Dry contact mechanical relay  
 Normally open

#### Relay Rating:

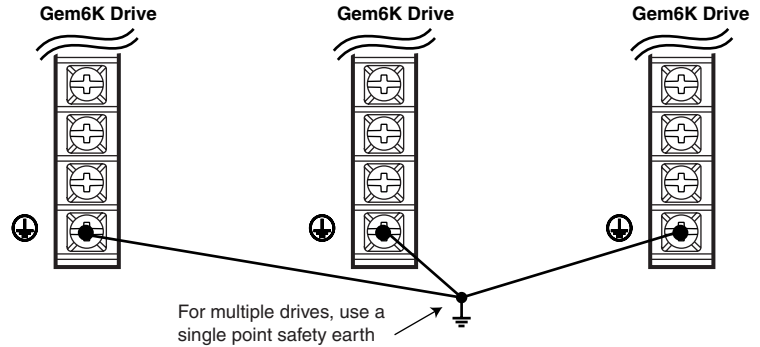
5 amps at 24VDC or 120VAC

See the OUTFNC and OUTLVL commands in the *Gemini GV6K/GT6K Command Reference* for more information on configuring the relay.

## Multiple Drive Installations (optional)

### Safety Earth Connections

For multiple drive installations, we recommend a single point or “star” safety earth configuration, as shown in the next drawing.



*Multiple Drives: Single Point Safety Earth*

Under normal operation, no current should flow through the safety earth connection.

### Connecting V Bus±: Sharing the Power Bus (optional) (GV6K-U3n/6n/12n/H40n only)

You can connect the power buses of GV6K-U3n/6n/12n/H40n drives in parallel, through the V BUS+ and V BUS- terminals. With the buses connected in parallel, regenerated energy from one drive will be used by the other drives. (Do not connect GV6-H20n drives in parallel to each other or to other GemK or Gemini drives.)



**WARNING**



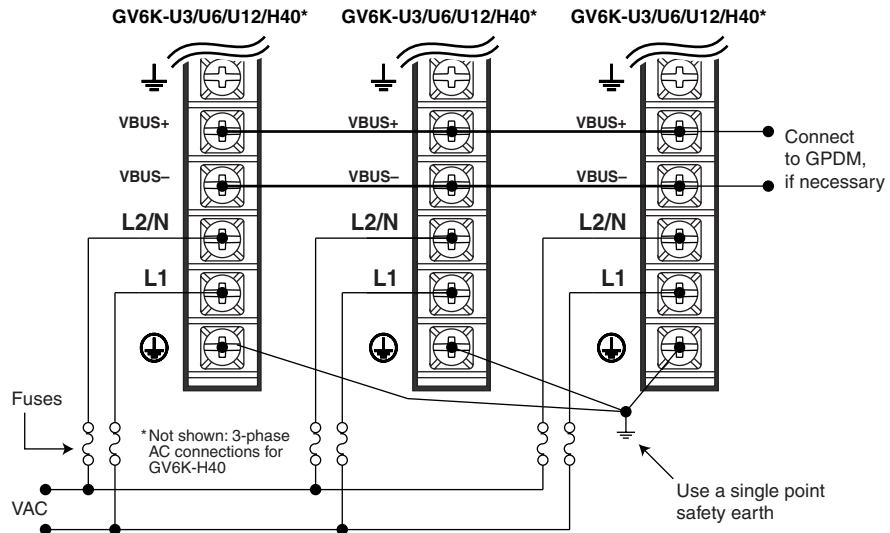
V BUS+ and V BUS- terminals are at hazardous voltages when power is applied to the drive, and for up to 30 seconds after power is removed. Lower voltages may still be present for several minutes after power is removed. Reinstall the clear plastic terminal cover after you make connections.



**CAUTION**



Connect together only V BUS± terminals of drives that share the same fused AC power source, as shown in the next drawing.



*Sharing the Power Bus*

If excess regenerated energy causes an overvoltage or regeneration fault, you can connect the Gemini Power Dissipation Module (GPDM) to the drive’s V BUS± terminals. See *Regeneration Protection* below for connection instructions and more information about the GPDM.

NOTE: Because the GV6K has a current inrush limiter, we recommend that you do not add additional bus capacitance to V BUS+ and V BUS-.

## Regeneration Protection

The following sections describe regeneration protection for GT6K and GV6K drives. The Gemini Power Dissipation Module is also described.

### Regeneration with GV6K-L3n/H20n/H40n; GT6K-L5/L8

GV6K-L3n, GV6K-H20n, GV6K-H40n and all GT6K drives have internal circuitry to protect them from *regeneration*—energy from the load during deceleration. Excessive regeneration can cause:

- Regeneration Fault (if regeneration occurs for an extended period of time)
- Overvoltage Fault – GV6K Only (see *Overvoltage Protection* in *Appendix A Specifications*)

Specifications for regeneration protection are:

Drive	Dissipation (watts):	Maximum Pulse Energy	Activation Conditions	
			Turn on:	Turn off:
GT6K-L5/L8	8W continuous 500W peak	1.3 KJ	218VDC	211VDC
GV6K-L3n	8W continuous 500W peak	1.3 KJ	200VDC	193VDC
GV6K-H20n	25W continuous (100W continuous at 40°C) 6KW peak	6 KJ	396VDC	385VDC
GV6K-H40n	150W continuous 9KW peak	9 KJ	396VDC	385VD

Results of Fault: Latched fault; power to motor is turned OFF; fault output is activated  
LEDs: Left = illuminated RED; Right = off

All temperatures in moving 50°C ambient air, unless otherwise noted.

## Regeneration with GV6K-U3n/U6n/U12n

GV6K-U3n/U6n/U12n drives do not have internal regeneration circuitry. Consequently, they cannot cause a regeneration fault. The drives can absorb the following amounts of regenerated energy in their internal capacitors:

Drive	Absorb (joules):	
GV6K-U3n	44 J	(from 340 – 410VDC: 1680 $\mu$ F)
GV6K-U6n/12n	59 J	(from 340 – 410VDC: 2240 $\mu$ F)

If excess regenerated energy causes overvoltage faults, you can connect the Gemini Power Dissipation Module (GPDM) to the V BUS $\pm$  terminals of these drives. Regenerated energy from the drive will then be dissipated in the GPDM.

### Gemini Power Dissipation Module (GPDM)

NOTE: The GPDM is designed for use with GV6K-U3n/U6n/U12n drives only. Do not use the GPDM with GV6K-L3n/H20n/H40n drives.

The GPDM dissipates excess regenerated energy in its internal resistors. If regenerated energy from the motor causes the drive's DC bus voltage to increase to 398VDC, the GPDM connects its resistors in shunt across the DC bus. Energy in the drive's capacitors is then dissipated as heat in the GPDM's resistors.

When the DC bus voltage decreases to 380VDC, the GPDM disconnects its resistors. If the motor continues to regenerate energy and the bus again rises to 398VDC, the process repeats until regeneration stops or a fault occurs.

The GPDM monitors three parameters, and generates a fault if any of the following are exceeded:

- maximum duty cycle
- maximum temperature
- maximum energy pulse

If the GPDM faults, it will disconnect itself from the DC bus and illuminate its red LED. Its internal fan will continue blowing. The GPDM will automatically clear the fault and reset itself within 10 seconds (an overtemperature fault may take longer to clear). When it resets itself, the GPDM will illuminate its green LED; the GPDM is then again ready to dissipate regenerated energy.

If regeneration continues while the GPDM is in a faulted state, the drive may experience an overvoltage fault. If you look for the cause of the drive overvoltage fault, be aware that it may have been caused by a prior GPDM fault—even though the left LED is now green.

If excessive regeneration continues to cause GPDM faults or drive faults, you can connect a second GPDM, as shown in the *GPDM Connections* drawing below.

### GPDM Specifications

Activation Conditions:	Turn on: 398VDC Turn off: 380VDC
Resistance:	Six 100 ohm resistors in parallel (16.7 ohm equivalent)
Continuous Dissipation:	300W in 25°C internal ambient
Maximum Dissipation:	9KW
Maximum Pulse Energy:	13KJ (pulse rating of resistors, repeatable, not to exceed continuous rating)
Weight:	3.1 pounds (1.4 kg)

### GPDM LED Color Code:

Left:	Right:	Status:
Green	Off	ready
Green	Yellow*	active
Red	Off	fault (max. temperature, duty cycle, or pulse exceeded)

\*Yellow LED may flash or be continuously illuminated until GPDM stops dissipating

## GPDM Connection Instructions



### WARNING



Sheet metal and exhaust air at the top of the enclosure are hot. Avoid contact.

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### WARNING



V BUS+ and V BUS- terminals are at hazardous voltages when power is applied, and for up to 30 seconds after power is removed. Lower voltages may still be present for several minutes after power is removed. Reinstall the clear plastic terminal cover after you make connections.

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### WARNING



Only connect V BUS± terminals of drives that share the same fused AC power source, as shown in the next drawing.

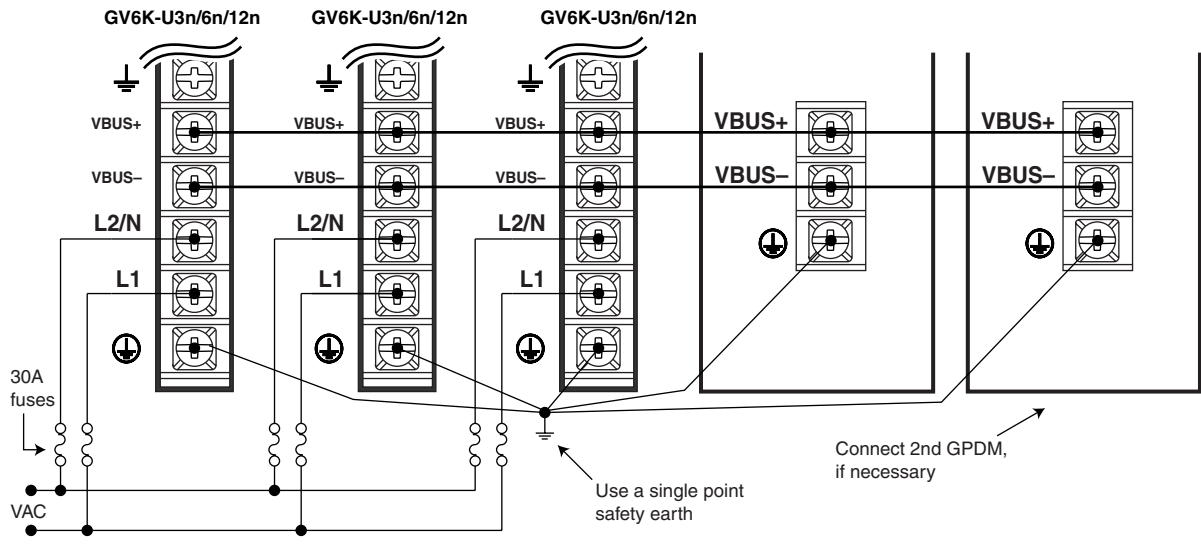
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### Connecting the GPDM

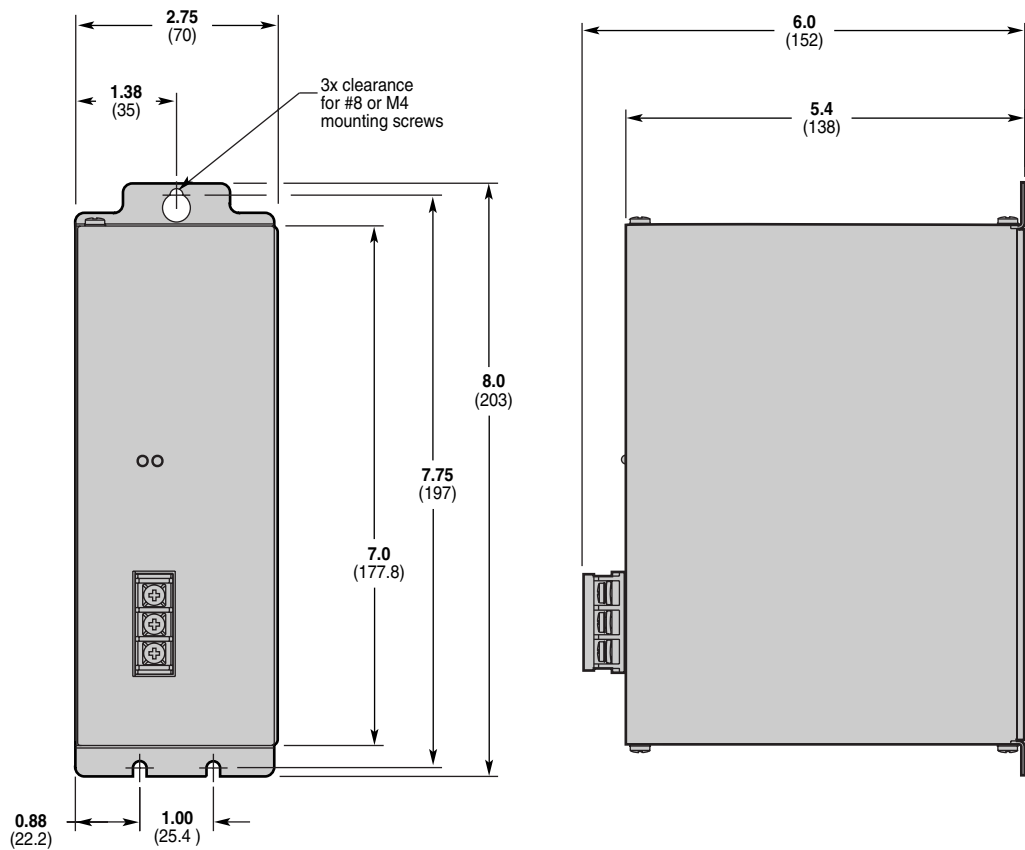
1. Connect up to three GV, GV6 or GV6K Servo Drives to one GPDM. (Connect *only* GV(6)(K)-U3n/U6n/U12n drives; do not connect any other drives to the GPDM.)
2. Connect drive V BUS+ terminals to V BUS+ on the GPDM.
3. Connect drive V BUS- terminals to V BUS- on the GPDM.
4. For multiple drives, connect drive safety earth terminals to a single point ground.
5. Keep connections between drive and GPDM less than 12 inches (300 mm). Use 14 AWG (2.5 mm<sup>2</sup>) or greater diameter wire.

The next figure shows a typical installation.



*GPDM Connections*

The next figure shows GPDM dimensions.



*Dimensions – GPDM Power Dissipation Module*

## Aligning the Resolver – GV6K Servos (optional)

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Resolvers on Compumotor motors are aligned at the factory. Ordinarily, no further alignment is required. However, you may wish to align the resolver if you suspect the resolver is misaligned, or if you are using a non-Compumotor motor.

### A Note About Resolver Speed

Resolver speed describes the relationship between resolver *electrical* revolutions and shaft *mechanical* revolutions. For example, if one resolver electrical revolution is equal to one shaft mechanical revolution, the resolver is a “single speed” or “one speed” resolver. If two electrical revolutions equal one mechanical revolution, the resolver is a “two speed” resolver.

The following alignment procedures assume you have configured the drive with an accurate resolver speed value. For Compumotor motors, resolver speed is loaded from the motor configuration file.

## Resolver Alignment Procedures

There are three methods to align the resolver:

- Method 1 – Enter a known resolver offset angle.
- Method 2 – Find an unknown resolver offset angle, and store it in the drive’s nonvolatile memory.
- Method 3 – Loosen the resolver cleats and rotate the housing while monitoring offset angle. Secure the housing when the angle is zero degrees.

Details for these methods are given below.

### Method 1 – Entering a Known Offset Angle

1. Disconnect the load from the motor shaft. The shaft should be free to rotate.
2. Issue an SRSET command; include the desired offset angle. For example, entering SRSET10 automatically sets the offset angle to 10 resolver electrical degrees.



**WARNING**



The SRSET command takes effect immediately. If you set the offset angle incorrectly the system may become unstable.

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3. Issue a DRESET command. The drive stores the value for the offset angle into nonvolatile memory. It uses this value for all future operations. You do not need to perform this procedure again.

## Method 2 – Finding an Unknown Offset Angle

Use this method if you do not know your resolver's offset angle.

1. Disconnect the load from the motor shaft. The shaft should be free to rotate.
2. Verify correct motor wiring. See the *Gemini Motor Reference Manual* for wiring information for Compumotor motors.
3. Configure the drive for your motor, as described in *Chapter 2 Installation*. If you use a non-Compumotor motor, create and download a motor configuration file for your motor.
4. Enable the drive.
5. Issue a DMODE13 command to put the drive into autorun mode. The motor should begin turning clockwise at approximately 1 rps, as viewed from the shaft end of the motor. If the motor turns in the wrong direction or at the wrong speed, check the motor wiring, and verify correct motor pole configuration (DPOLE command).
6. Issue a DMODE11 command to put the drive into alignment mode. The motor will stop turning.
7. Issue an SRSET command. The motor may turn as much as 1/2 revolution. It will stop when the motor magnetic poles align.
8. Disable the drive. Upon being disabled, the drive stores the value for the offset angle into nonvolatile memory. It uses this value for all future operations. You do not need to perform this procedure again.
9. Return the drive to the appropriate mode of operation (DMODE command).

## Method 3 – Rotating the Resolver Housing

Use this method to manually rotate the resolver to a specific offset angle (usually zero degrees).

1. Disconnect the load from the motor shaft. The shaft should be free to rotate.
2. Verify correct motor wiring. See the *Gemini Motor Reference Manual* for wiring information for Compumotor motors.
3. Configure the drive for your motor, as described in *Chapter 2 Installation*. If you use a non-Compumotor motor, create and download a motor configuration file for your motor.
4. Enable the drive.
5. Issue a DMODE13 command to put the drive into autorun mode. The motor should begin turning clockwise at approximately 1 rps, as viewed from the shaft end of the motor. If the motor turns in the wrong direction or at the wrong speed, check the motor wiring, and verify correct motor pole configuration (DPOLE command).
6. Issue a DMODE11 command to put the drive into alignment mode. The motor will stop turning.
7. Issue an SRSET command. The motor may turn as much as 1/2 revolution. It will stop when the motor magnetic poles align.
8. Loosen the cleats that hold the resolver housing onto the motor.
9. Issue a TSROFF command repeatedly as you slowly turn the resolver housing. The TSROFF command indicates the present resolver offset angle.
10. Turn the resolver housing until the offset angle is zero degrees (or until you obtain your desired offset angle).
11. Tighten the cleats.
12. Disable the drive. Upon being disabled, the drive stores the value for the offset angle into nonvolatile memory. It uses this value for all future operations. You do not need to perform this procedure again.
13. Return the drive to the appropriate mode of operation (DMODE command).

# RS-232/485 Communications

The Gem6K uses an ASCII language for communication. Gem6K drives can be connected together in RS-232 Daisy Chains and RS-485 Multi-Drop configurations.

In this section:

- Establishing Communications
- Configuring the Serial Ports
- RS-232 Communications
- RS-232 Daisy Chaining
- RS-485 Communications (COM1 only)
- RS-485 Multi-Drop (COM1 only)

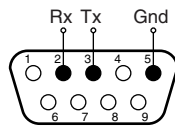
## Establishing Communications

The Gem6K has two serial ports located on the front of the drive. Both are 9 pin D-connectors. One is labeled “RS-232/485”; this port is referred to as COM1. The other is labeled “RS-232”; this port is referred to as COM2.

### RS-232/485 Connector

You can use the RS-232/485 connector (COM1) for either RS-232 or four wire RS-485 communications, as shown below.

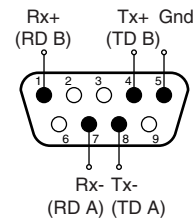
RS-232 Connections



Pin Assignments

1. RS-485 Rx+ (RD B)
2. RS-232 Receive
3. RS-232 Transmit
4. RS-485 Tx+ (TD B)
5. Ground
6. No connection
7. RS-485 Rx- (RD A)
8. RS-485 Tx- (TD A)
9. No connection

RS-485 Connections



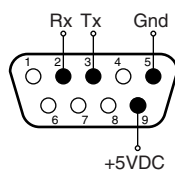
#### RS-232/485 Connector (COM1) – Connections

To communicate with the Gem6K, connect its RS-232/485 connector to a PC running Motion Planner, or other terminal emulation software. Verify your computer’s connector pinout; you may need to use a “null modem” cable to connect your computer’s transmit terminal to the Gem6K’s receive terminal, your computer’s receive terminal to the Gem6K’s transmit terminal, and your computer’s ground terminal to the Gem6K’s ground terminal.

### RS-232 Connector—and the RP240 Remote Operator Panel

You can use the RS-232 connector (COM2) for RS-232 communications (but *not* RS-485), or to connect an RP240. Its pinout is shown in the next drawing.

RS-232 Connector



Pin Assignments

1. No connection
2. RS-232 Receive
3. RS-232 Transmit
4. No connection
5. Ground
6. No connection
7. No connection
8. No connection
9. +5VDC

#### RS-232 Connector (COM2) – Connections

Issue these commands to configure the RS-232 connector for use with an RP240:

PORT2 ; Select the RS-232 connector (COM2) as the port affected by  
; the DRPCHK1 command.  
DRPCHK1 ; On power up, check for RP240 on COM2.

**NOTE:** The +5VDC output on Pin 9 has short circuit protection/inrush current protection. If you plug in the RP240 while power is applied, the protection circuit may sense the inrush current and shut down the +5VDC output. To recover from this condition, you may need to cycle power or reset the drive.

## Configuring the Serial Ports

To control the applicable port for setting up serial communication and transmitting ASCII text strings, use the PORT command:

PORT1 ; Selects the RS-232/485 connector (COM1)  
PORT2 ; Selects the RS-232 connector (COM2)

The following commands can be used to configure the Gem6K serial ports and the terminals used by Motion Planner. Complete descriptions of these commands can be found in the *Gemini GV6K/GT6K Command Reference*.

DRPCHK RP240 Check  
E Enable Serial Communication  
ECHO Enable Communication Echo  
BOT Beginning of Transmission Characters  
BAUD Serial Communication Baud Rate  
EOT End of Transmission Characters  
EOL End of Line Terminating Characters  
ERRBAD Error Prompt  
ERRDEF Program Definition Prompt  
ERRLVL Error Detection Level  
ERROK Good Prompt  
XONOFF Enable or disable XON/XOFF

- The default baud rate for the Gem6K is set at 9600. The RS-232/485 connector (COM1) only supports 9600 baud. The RS-232 connector (COM2) supports other baud rates; see the BAUD command for more information.
- The Gem6K'S RS-232/485 connector (COM1) contains connections for both RS-232 and RS-485 communication. The Gem6K will automatically switch between RS-232 and RS-485 mode depending on which connections in the port's 9 pin D-connector are active. See wiring diagrams. The RS-232 connector(COM2) only supports RS-232 communication.
- Some RS-232 cables use hardware handshake signals that are used by the RS-485 pins. The RS-485 interface will automatically disable itself if this is detected. If this occurs, you must reset the drive to re-enable the RS-485 interface.
- Enabling Ethernet communications (NTFEN1) will disable the RS-232/485 connector (COM1).

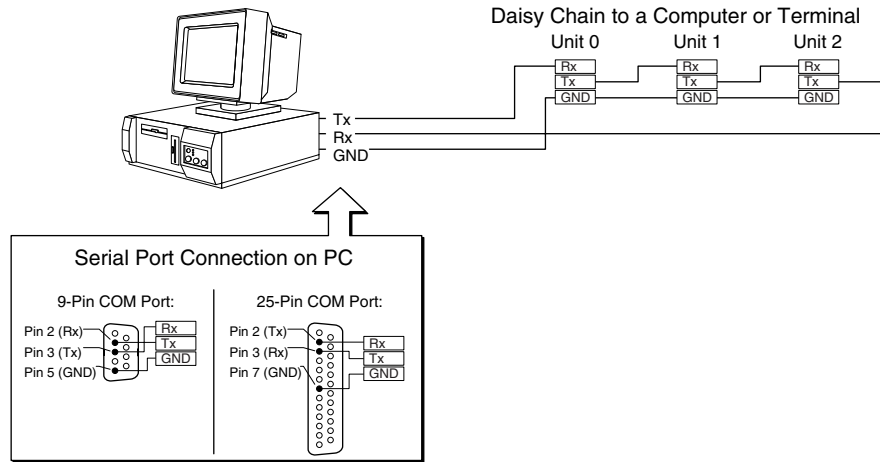
# RS-232 Communications

## Pin Out for RS-232 Communication:

### Pin Description

- 2 Rx (receive). Connect to Tx on your computer.
- 3 Tx (transmit). Connect to Rx on your computer.
- 5 GND (logic ground). Connect to GND on your computer

- Maximum RS-232 cable length is 50 feet (15.25 meters)
- To establish unique addresses for daisy chained units, use the ADDR command.



RS-232 Daisy Chain Connections

## RS-232 Daisy Chaining

Up to ninety-nine stand-alone Gem6K drives may be daisy chained. You can use either the RS-232/485 connector (COM1) or the RS-232 connector (COM2) for daisy chaining.

There are two methods of daisy chaining: one uses a computer or terminal as the master controller in the chain; the other uses a Gem6K as the master controller.

Follow the steps below to implement daisy chaining with a terminal as the master. (See the *Programmer's Guide* for details on using a Gem6K as master controller.)

### Step 1

Connect the daisy chain with a terminal as the master. (See the previous drawing.)

To enable and disable communications on a particular drive unit in the chain, you must use the Daisy Chain Address (ADDR) command to establish a unique device address for each unit. The ADDR command automatically configures unit addresses for daisy chaining. This command allows up to 99 units on a daisy chain to be uniquely addressed, starting with Address 1.

Sending ADDR<sub>i</sub> to the first unit in the daisy chain sets its address to be (i). The first unit in turn transmits ADDR<sub>(i + 1)</sub> to the next unit to set its address to (i + 1). This continues down the daisy chain until the last unit of (n) daisy chained units has its address set to (i + n).

Note that only a drive with the device address of zero (0) will send an initial power-up start message. (ADDR<sub>0</sub> is not normally used in a daisy chain.)

## Step 2

The error level must be set to 1 for all units on the daisy chain (ERRLVL1). When the error level is not set to 1, the unit sends ERROK or ERBAD prompts after each command, which makes daisy chaining impossible. Send the ERRVL1 command to each unit in the chain. (NOTE: To send the ERRVL1 command to one specific unit on the chain, prefix the command with the appropriate unit's device address and an underline.)

### Example Commands:

```
PORT1          ; Select the "RS-232/485" connector (COM1), as the port affected
                ; by the following commands.
1_ERRVL1      ; Set error level to 1 for unit #1
2_ERRVL1      ; Set error level to 1 for unit #2
3_ERRVL1      ; Set error level to 1 for unit #3
```

After this has been accomplished, a carriage return sent from the terminal will not cause any unit to send a prompt. Verify this.

To send a command to all units on the daisy chain, send the command from the master terminal:

### Example Commands:

```
OUT1111        ; Turn on onboard outputs 1 – 4 on all units
A50            ; Set acceleration to 50 for all units
```

To send a command to one particular unit on the daisy chain, prefix the command with the appropriate unit's device address and an underline:

### Example Commands:

```
2_OUT0        ; Turn off onboard output 1 on unit #2
4_OUT0        ; Turn off onboard output 1 on unit #4
```

To receive data from one particular unit on the chain, prefix the command with the appropriate unit's device address and an underline:

### Example Commands:

```
2_ERES        ; Request drive resolution from unit #2
*ERES4000      ; Response from unit #2
```

Use the E command to enable/disable RS-232 communications for an individual unit. If all drive units on the daisy chain are enabled, commands without a device address identifier will be executed by all units. Because of the daisy chain's serial nature, the commands will be executed approximately 1 millisecond per character later on each successive unit in the chain (assuming 9600 baud).

Units with RS-232 disabled (EØ) will not respond to any commands, except E1; however, characters are still echoed to the next device in the daisy chain.

### Example Commands:

```
3_EØ         ; Disable RS-232 on unit #3
ERES2000      ; Set encoder resolution to 2000 on all other units
3_E1         ; Enable RS-232 on unit #3
3_ERES4000   ; Set encoder resolution to 4000 on unit #3
```

Verify communication to all units by using the techniques described above.

## Step 3

Now that you have verified that the daisy chain is set up properly, you can use the various Motion Planner tools to configure, program and monitor all units on the daisy chain. Alternatively, units can be programmed individually by connecting the master terminal to one unit at a time.

## Additional Instructions

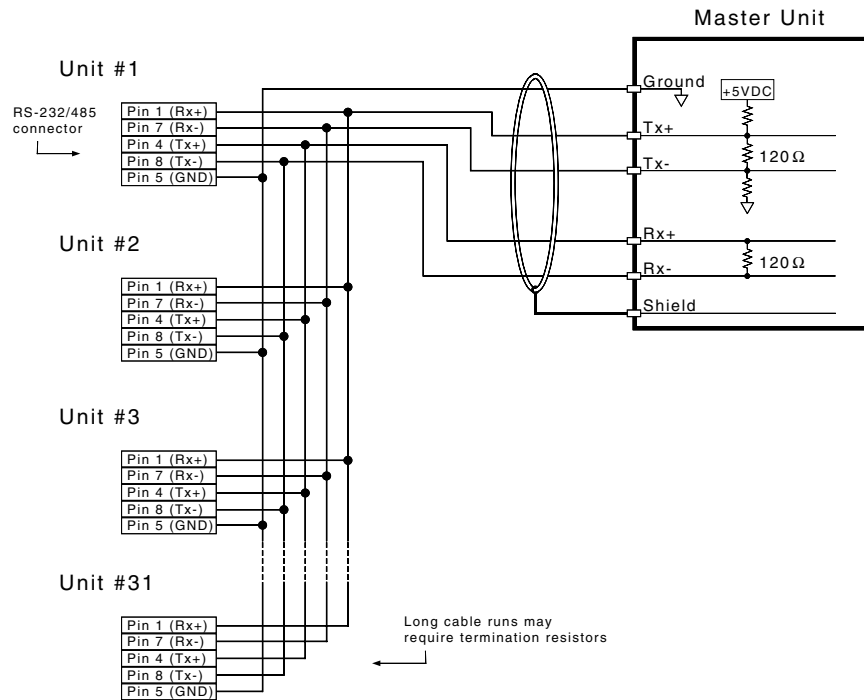
For more information, see *RS232-C Daisy Chaining* in the *Programmer's Guide*.

## RS-485 Communications (COM1 Only)

### Pin Out for 4-Wire RS-485 Communications:

Pin	Description
1	Rx+ (also called RD B)
4	Tx+ (also called TD B)
5	GND (logic ground)
7	Rx- (also called RD A)
8	Tx- (also called TD A)

- Maximum RS-485 cable length is 4000 feet (1220 meters).
- To establish unique addresses for multi-drop units, use the ADDR command.
- Keep wires as short as possible. Termination resistors may be required on long cable runs.
- Connect RS-485 cables before applying power to the drive.  
(Reconnecting the cables with power applied may cause the drive to interpret intermittent connections as RS-232 hardware handshake signals; this may result in shutdown of the RS-485 interface. If this happens, reset the drive to re-enable the RS-485 interface.)
- Recommended cable: Belden 9842.
- Refer to the diagram below for connection information.



RS-485 Multi-drop Connections

## RS-485 Multi-Drop (COM1 Only)

Up to 99 Gem6K drives may be multi-dropped. You **must** use the RS-232/485 connector (COM1) for multi-drop connections. (See the previous drawing.)

The ADDR command allows you to establish up to 99 unique addresses. To use the ADDR command, you must address each unit individually before it is connected on the multi drop. For example, given that each product is shipped configured with address zero, you could set up a 4-unit multi-drop with the commands below, and then connect them in a multi drop:

1. Connect the unit that is to be unit #1 and transmit the Ø\_ADDR1 command to it.
2. Connect the unit that is to be unit #2 and transmit the Ø\_ADDR2 command to it.
3. Connect the unit that is to be unit #3 and transmit the Ø\_ADDR3 command to it.
4. Connect the unit that is to be unit #4 and transmit the Ø\_ADDR4 command to it.

If you need to replace a unit in the multi drop, send the Ø\_ADDRi command to it, where “i” is the address you wish the new unit to have. For RS-485 multi-drop to work properly, each drive must have echo mode turned off (ECHOØ).

In order to prevent the collision of prompts being transmitted simultaneously from several drives in response to a global command, you must configure the drives for either error level 2 or error level 0 in multi-drop mode. This can be done as follows:

**Commands:**

- |           |                                    |
|-----------|------------------------------------|
| 1_ERRLVL2 | ; Set error level to 2 for unit #1 |
| 2_ERRLVL2 | ; Set error level to 2 for unit #2 |
| 3_ERRLVL2 | ; Set error level to 2 for unit #3 |

In general, to send a Gem6K command from the master unit to a specific unit in the multi-drop, prefix the command with the unit address and an underscore (e.g., 3\_ERES4000 sets the encoder resolution to 4000 on unit #3). The master unit may receive data from a multi-drop unit. You should now verify that you can access each unit on the multi-drop.

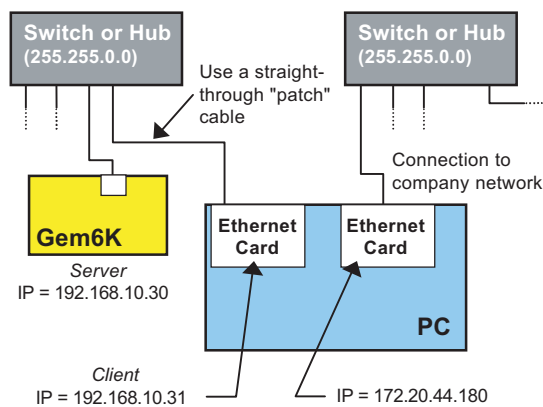
Now that you have verified that the multi-drop is set up properly, you can use the various Motion Planner tools to configure and monitor all units on the multi-drop.

## Ethernet

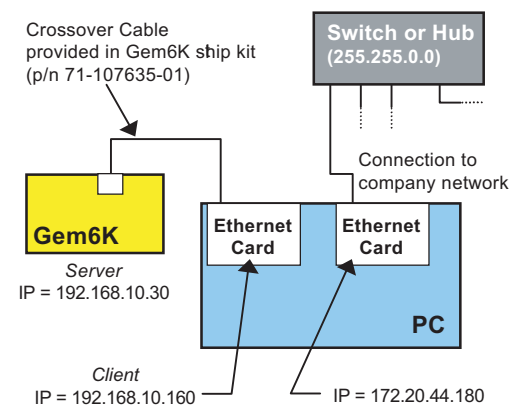
The Gem6K is equipped for Ethernet communication. It includes 10Base-T (10Mbps twisted pair) TCP/IP protocol. The default IP address is 192.168.10.30.

The Ethernet connector is an RJ-45 connector located on the Gem6K’s front panel. The next drawing shows connections for a closed network, and for connecting the Gem6K directly to a PC.

**EXAMPLE — Closed Network:**



**EXAMPLE — Direct Connect to PC:**



*Ethernet Connections*

**Status LEDs:**

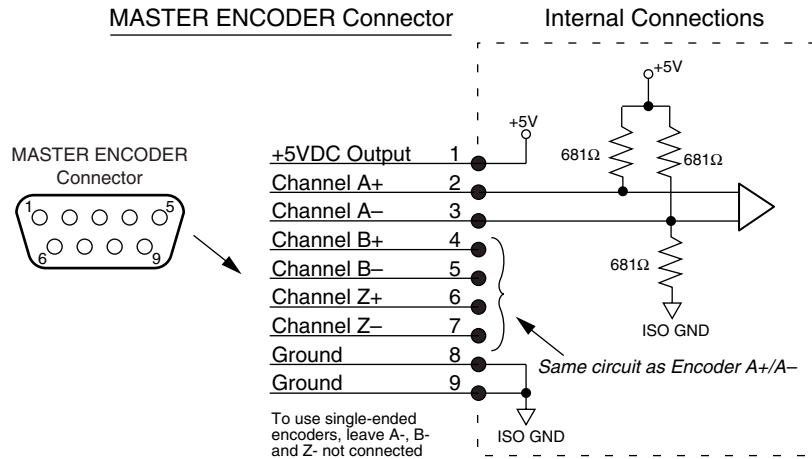
Green LED is on when the Ethernet physical connection is OK.  
 Yellow LED is on when the Gem6K is transmitting over the Ethernet interface

For complete information about using Ethernet with the Gem6K, see the *Ethernet* section of the *Programmer’s Guide*.

# Master Encoder

The master encoder is used for Following only—not for servo feedback or stepper stall detect.

The pinout for the 9 pin D-connector is shown below.



Master Encoder Connections

# Expansion I/O

EVM32-II I/O modules (or “bricks”) are sold as accessories to the Gem6K. The EVM32-II provides more I/O than the Gem6K offers onboard. Up to eight DIN-rail mountable EVM32-II bricks can be connected in a serial chain to the Gem6K. Each EVM32-II brick can hold from one to four I/O SIM boards in any combination (each SIM board provides eight I/O points, for a total of 32 I/O points per I/O brick.)

NOTE: Instructions in this section also apply to the EVM32.

## EVM32-II Connection Instructions



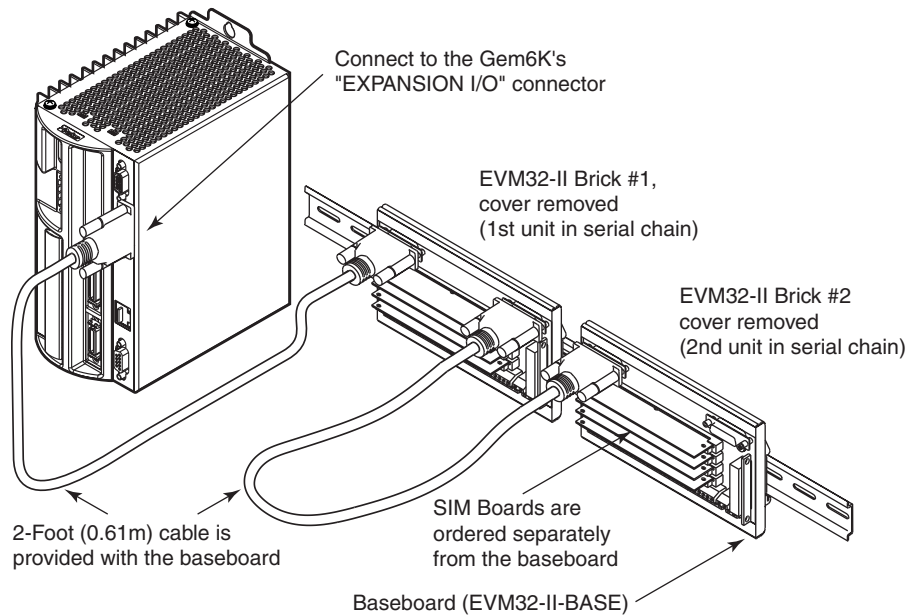
**CAUTION**



Remove power to the Gem6K and the EVM32-II baseboard before:

- Installing or removing SIM boards on the EVM32-II baseboard
- Connecting or disconnecting the EVM32-II baseboard to the Gem6K or to other EVM32-II units
- Connecting inputs and outputs to the EVM32-II

Connect EVM32-II modules to the Gem6K’s EXPANSION I/O connector, as shown in the next diagram.



#### *EVM32-II Connections*

For EVM32-II or SIM dimensions, power requirements, specifications, etc., see the documentation that accompanied your EVM32-II or SIM module.

## Disconnecting EVM32-II I/O Bricks

If the EVM32-II I/O brick is disconnected (or if it loses power), the Gem6K will perform a kill (all motion and program execution on all tasks) and set error bit #18 (reported with the TER, TERF, and ER commands). The Gem6K will remember the brick configuration (volatile memory) in effect at the time the disconnection occurred. When you reconnect the I/O brick, the drive checks to see if anything changed (SIM by SIM) from the state when it was disconnected. If an existing SIM slot is changed (different SIM, vacant SIM slot, or jumper setting), the drive will set the digital input SIMs and digital output SIMs to factory default INEN and OUTLVL settings, respectively. If a new SIM is installed where there was none before, the new SIM is auto-configured to factory defaults.

To check the status of one or more EVM32-II I/O bricks, use the TIO command.

## Updating the Drive's Operating System

The Gem6K runs under an internal software operating system (firmware). The operating system was loaded into your drive during the manufacturing process, and under ordinary circumstances you will not need to update your drive's operating system. However, because Compumotor continues to add enhancements, you may want to upgrade the operating system. You may obtain a new operating system file from the Compumotor web site, or from Technical Support (see phone numbers on the inside cover of this manual).

**NOTE:** To download the operating system to the drive, you must use the 9-pin connector labeled RS-232 (which is COM2). Do not use the connector labeled RS-232/485.

#### Web Site Download

The operating system file is located in the software download section of the *Compumotor Online* web site (<http://www.compumotor.com>). For example, the operating system file for version 6.0 is called 6kos6p0.ops. Download the file to the Motion Planner directory on your hard drive.

#### Update Procedure

1. Using the Gem6K's RS-232 connector (COM2), connect to your computer's RS-232 serial communication port.

**NOTE:** You can download the operating system to only one drive unit at a time and you must use RS-232 communication (no daisy chains).

**NOTE:** You must use the Gem6K's RS-232 connector (COM2), not the RS-232/485 connector (COM1).

2. Launch Motion Planner
3. In the Default Communications Settings dialog box, select your Gem6K drive and select the PC's serial port to which the drive is connected, then click "OK".
4. Click on the Terminal tab to expose the terminal emulator.
5. From the Communications pull-down menu, select Download OS. When presented with the Locate Gem6K Operating System dialog, locate the operating system file and click the Open button. This initiates the download to the drive and displays the download status dialog.
6. When the download is completed successfully, Motion Planner displays a confirmation message. Also, the drive automatically resets itself and displays the power up message. Check the TREV report to verify that the proper operating system revision is now in the drive (e.g., the response:

\*TREV92-016740-01-6.0 GEM6K GV6K-L3E D1.74 F1.62

indicates that the drive is using OS revision 1.74, denoted by "D1.74").

**NOTE:** If the download is interrupted or corrupted, the drive will flash the left LED (red) until a valid operating system is downloaded.