



# TOSHIBA

## Toshiba G3 Workbook

Applications workbook



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## *Workbook*

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The insertion type density meter (110 pages)

## Summary of Contents for Toshiba G3

[Page 1](#) G3 Applications Workbook...

[Page 2](#) G3 Applications Workbook © 2006 Toshiba International Corporation Industrial Division 13131 West Little York Road Houston Texas 77041 Phone 800.231.1412 • Fax 713.896.5242 [www.toshiba.com/ind...](http://www.toshiba.com/ind...)

### [Page 3: Table Of Contents](#)

Trim Dancer Control 120 Hz Constant Torque Operation of a 60 Hz Motor Overspeed Drooping Carrier Frequency Derating Load Sharing Application Tosline F10 Communications With G3 Inverter and T2 PLC Toshiba S20 Fiber Optics Communication Changing the G3 LCD Display to German...

## [Page 4: Programmable Monitoring](#)

**Programmable Monitoring** The G3 has an extensive monitoring system which is employed via the keypad. The information given in the monitor displays is useful while troubleshooting or commissioning applications. Display Description **MOTOR RUN DIRECTION**: Indicates direction associated with speed reference. Keypad direction reference **FORWARD** is separate from terminal strip direction reference.

**Page 5** Displays the frequency the feedback signal represents Motor OL ratio Example: G3 is rated 150% for 2 min. If you run at 150% for 1 minute, monitor will Inverter OL ratio read "50%". These monitors represent remaining overload capability. If any monitor DBR OL ratio hits 100%, the drive trips.

## [Page 6: Binary Input](#)

**Binary Input Introduction** Among the many types of speed reference the G3 can accept is a binary coding. The binary code is based upon the value of the programmed value of the Maximum Output Frequency (MOF) in the **UTILITY PARAMETERS** group. A maximum of seven bits is available to code for the desired speed (ten with the option board).

**Page 7** If you need more terminals (for more bits and more accuracy), see Potential Terminal Function in the **TERMINAL SELECTION PARAMETERS** group and Guideline 10, Programming the Input Terminals. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

## [Page 8: Pattern Run](#)

**Pattern Run Introduction** Like the G2/G2+, the G3 has a Pattern Run feature. Pattern Run allows the user to associate a time, direction, accel/decel time, and volts/hertz pattern with each preset speed. Any seven of the fifteen preset speeds can be strung together to create a pattern;...

**Page 9** Input Terminal Selection **TERMINAL SELECTION PARAMETERS "S1"** Input Terminal Function ...make sure the **LOCAL/REMOTE LED** is off, 'F'-'CC' or 'R'-'CC' is made, and close 'S1' to 'CC'. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

**Page 10** Guideline 10, Input Terminals), the drive steps through the pattern's speeds every time a momentary contact closure is made to 'CC'. Any programmed speed time is ignored. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

## [Page 11: Preset Speeds](#)

**Preset Speeds Introduction** Among the many speed references the G3 can accept are dry contact closures which it can be programmed to interpret as preset speeds. A maximum of fifteen preset speeds can be accessed via four terminals and a binary implementation.

**Page 12** \* If Preset Speed Mode Activation is left at "0" (as it is in this example), then the direction of a preset speed run is determined by contact closure on the terminal strip. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

**Page 13** TIP: If you have from two to four preset speeds, use speeds #1, 3, 7, and 15. This reduces the number of contact openings/closings that have to take place. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

## [Page 14: Motor Operated Pot1 \(Mop\)](#)

**Motor Operated Pot1 (MOP) Introduction** Frequently used for pendant stations on cranes, MOP control generates a speed reference for the G3 based on how long a momentary contact is made. When the "increase" contact is made, the drive increases its output frequency until the contact is released, at which point it maintains the current frequency.

## [Page 15: Motor Operated Pot2 \(Mop\)](#)

Motor Operated Pot2 (MOP) Introduction Frequently used for pendant stations on cranes, MOP control generates a speed reference for the G3 based on how long a momentary contact is made. When the "increase" contact is made, the drive increases its output frequency until the contact is released, at which point it maintains the current frequency.

[Page 16](#) "S2" Input Terminal Function TERMINAL SELECTION PARAMETERS "S3" Input Terminal Function FREQUENCY SETTING PARAMETERS Frequency Priority Selection #1 FREQUENCY SETTING PARAMETERS Frequency Priority Selection #2 For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

## [Page 17: Three Wire Control](#)

Three Wire Control Introduction The G3 can be programmed to allow three-wire start/stop functionality without the use of an external relay. Notice: that the pushbuttons utilized are momentary. The switch 'S3' determines direction. Remember to cycle power when finished with any super user programming.

[Page 18](#) 046A READ/WRITE up arrow until READ/WRITE 046A alternating with 8, then 046A OUTPUT FREQUENCY 0.0 Hz Cycle power when finished with programming For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

## [Page 19: Master-Follower](#)

Like all G3 speed references, there is a bias/gain adjustment to allow ratioing of speeds between the master and the follower(s). The cards are connected in parallel with a twisted pair.

[Page 20](#) PARAMETERS group to verify (the other version is 101). If you do not have a version 120 CPU, contact inverter marketing and request an option ROM for your version of CPU. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

## [Page 21: Programming The Input Terminals](#)

Introduction When the G3 is first taken out of the box, its terminals function in the same way the G2+'s did; the "F" terminal started a forward run when shorted to "CC", the "R" terminal started a reverse run when shorted to "CC", etc.

[Page 22](#) Potential Terminal Function, the drive would do nothing but ESTOP. The G3's terminals can be programmed to activate their assigned functions when a normally closed contact opens - contact factory for information on this Super User feature. See Guideline 10, Three Line Control for a programming example.

## [Page 23: Trim Pot](#)

Trim Pot Introduction This guideline will outline a G3 feature that allows a speed reference to be "fine tuned" on the fly via another reference, called the "trim". All trim sources mentioned below allow addition to the regular reference; a +/- trim is available only when using the RR terminal along with Override Control Selection in the FEEDBACK PARAMETERS GROUP.

[Page 24](#) Point #1 Frequency". As soon as this parameter is set to a non-zero value, its reference value is added to the 4-20 mA's reference value. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

## [Page 25: Speed Band Output](#)

Speed Band Output Introduction A G3's output contacts can be programmed to change state based upon its output frequency. In the following example, the customer's system will see a short when the output frequency is between 40 and 50 Hz and an open when at any other speed.

## [Page 26: Adjustable Remote Torque Limit](#)

Adjustable Remote Torque Limit Introduction The following programming steps enable on-the-fly remote torque limit on the G3. This limit is adjusted via a speed pot connected to the 'RR'



terminal. If you want to use another speed pot for a speed reference, connect its wiper to 'RX'...

[Page 27](#) You may want to program one of the monitors (i.e. Status Monitor #1 Display Select in the UTILITY PARAMETERS group) to be "RR Input Value" (setting value 14) so that you can see what is being applied to the 'RR' input. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 28: Unblinded Groups Default](#)

After this programming is completed, the drive will be set to Toshiba factory defaults and all the programming groups except the macros will be unblinded. At any time, to reset the drive back to Toshiba defaults with the groups unblinded, put a "6" in Standard Setting Mode Selection in the UTILITY PARAMETER group.

### [Page 29: Bypass Control](#)

The interposing relays (R3 and R4) shown above may not be necessary; the RCH and LOW output contacts of the G3 are rated for 250 VAC, 1 A for inductive loads; compare with the burden of your bypass and output contactors' coils.

[Page 30](#) If the operating frequency at the time of S2-CC closure is greater than CPISF, the drive will decrease its frequency before changing contact states. The delay between RCH and LOW contact switching is about 0.6 seconds. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 31: Cyclic Overhauling Load](#)

Typically, dynamic braking resistors are employed to take the regenerative energy and dissipate it as heat. With the G3 inverter, these resistors may no longer be necessary because the drive can detect negative torque current and responds to it by increasing the output frequency to eliminate regenerative current.

[Page 32](#) E0. E0 is the fastest response time, E7 is the slowest. Recommend starting at E5 for first test. iii) Adjust 03AF as necessary to achieve desired performance. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 33](#) 8Hz and an Overvoltage trip occurs after the frequency advances 8 Hz. Value Chart 03B3 Value Resulting Value 8 Hz 16 Hz 32 Hz 64 Hz For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 34](#) Remember - this is a software controlled digital device. You need only be off by 1 to be 100% incorrect. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 35: True Torque Control](#)

True Torque Control Introduction To maximize the performance of the motor/drive combination, the G3 must be tuned to the motor. G3s have mathematical models of all standard efficient and premium efficient Houston-made Toshiba motors stored on a ROM. These models are used by the drive to increase the motor's low speed torque and to reduce the load's affect on RPM (when compared to its performance on a V/Hz drive).

### [Page 36: Acc/Dec Time Switching Frequency](#)

The G2 allowed a user to remotely select which of its two accel/decel times was active at any time via a contact closure (from a prox switch for example) on its terminal strip. In addition to this, the G3 can switch accel/decel times at a programmed output frequency.

### [Page 37: Direction Change With Rx Input](#)

Direction Change with RX Input Introduction Like all speed references on the G3, the RX input has an adjustable bias and gain. The RX is unique, however, in that its inputs can be positive or negative and the corresponding speeds can be positive or negative.

[Page 38](#) FREQUENCY SETTING PARAMETERS RX Reference Setting Point #2 100 (default) FREQUENCY SETTING PARAMETERS RX Point #2 Frequency NOTE: Never connect the 'CC' terminal to ground. For additional assistance, please contact Toshiba Adjustable Speed Drive

Marketing Dept. at (800) 872- 2192...

### [Page 39: Half Speed Command](#)

Half Speed Command Introduction This application shows a way to make a G3 run at half of its current output frequency (whatever it may be) upon closure of a contact. This guideline utilizes Override Control to accomplish the desired control.

### [Page 40: Analog Outputs](#)

In general, it is best to calibrate any meter at its maximum deflection to minimize its error as a percentage of the total signal metered. On the G3, there are two ways of creating a meter maximum deflection condition for use in calibration: ON-THE-FLY ADJUSTMENT AND 100% FIXED OUTPUT ADJUSTMENT.

[Page 41](#) \* The number shown here is the drive's reference frequency. Make meter read the same frequency with the up/down arrows. The number displayed here will not change. Hit ENTER when adjusted. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 42](#) AM/FM Adjustment Parameters Unblind AM/FM TERMINAL ADJUSTMENT PARAMETERS FM Terminal Function Selection AM/FM TERMINAL ADJUSTMENT PARAMETERS Frequency Meter Adjustment AM/FM TERMINAL ADJUSTMENT PARAMETERS FM Terminal Function Selection For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 43](#) Frequency Meter Adjustment \*\*\*\* use the up/down arrows to make meter read the same value as the drive is displaying here. Hit ENTER when adjusted. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 44: Output Contacts](#)

P24' is a 24 VDC 50 mA supply that can be used to power coils or control devices. Do not connect 'CC' to ground The G3's output contacts are rated for 30 VDC, 1 amp; 250 VAC, 1 amp inductive, 2 amp resistive. Programming The function associated with the FLA/FLB/FLC, RCHA/RCHC, and LOWA/LOWC terminals is assigned by putting one of the following Setting Values in "RCH"...

[Page 45](#) Contact closes when overcurrent stall is not active (not overcurrent pre-alarm condition). Stall is adjustable with Stall Protection Current Level (PROTECTION PARAMETERS group) or Stall Protection Level #2 (FUNDAMENTAL PARAMETERS #2 group) For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 46](#) The drive trips on overload at 100%. Inverter overload pre-alarm starts at 50%. Contact closes to signify inverter is not in an overload pre-alarm. Example of inverter overload: G3 is rated for 150% of rated current for 2 minutes. If drive is operated at 150% of rated current for one minute, the inverter overload is at 50%, or half of its overload current-time capability.

[Page 47](#) Contact maintains current condition at 0.0 Hz when decel is complete after a stop command. Contact closes when drive has a run command and ST-CC is made Contact closes when drive does not have a run command For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 48: Pid](#)

Separately powered isolated transducers feed into the 'IV' and "CC" terminals. If your transducer is not isolated, order an isolated input board. The inputs to the standard G3 are not isolated; do not connect the 'CC' terminal to ground.

[Page 49](#) Setpoint via keypad: Press LOCAL/REMOTE button to illuminate the panel's green LED. Hit RUN and adjust the Frequency Command to whatever value it takes to develop the desired process variable value. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 50](#) Time 0 The above figure illustrates what is meant by the rise and settling times.

Suppose that a G3 is running at 30 Hz. At Time 0, all of the valves in the example system open. Suppose also that the drive now needs to speed up to 40 Hz to maintain the desired pressure.

[Page 51](#) (frequency command that Integral error new frequency reference to develops drive main circuit desired process condition) Differential Feedback (indicates actual process condition) error setpoint feedback For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 52](#) (there is steady-state error), decrease the integral time. Input to Integral Circuit error Time Output from Integral Circuit Proportional Gain times Time Integral Time For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 53](#) Output from Differential Circuit Derivative Time PID Drive Output Hz vs. Time (in response to pressure drop) Desired Response Time Improve by decreasing Integral Time For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 54](#) The G3's ACC/DEC control occurs before the PID block; in the G2+, it acted on the PID output. The Lag Time Constant and PID Deviation Upper/Lower Limits serve to smooth out the drive response.

[Page 55](#) The Proportional Gain, Integral Time, and Derivative Time values are read by the drive as they are adjusted; it is not necessary to hit WRITE after adjustment (expect parameter adjustment to immediately effect drive behavior). For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 56: Master/Follower: Pulse Output](#)

Master/Follower: Pulse Output Introduction The G3 can be configured in a master/follower scenario in many different ways. For information concerning the G3's RS485 master/follower function, see Application Guideline 9. The G3 has a high frequency pulsed output as standard that can be used in conjunction with a Extended Terminal Block Option Board (part number INV3-COM-D), to provide master/follower control.

[Page 57](#) 48,96, or 360 of these per output Hz per second, as set by "FP" Output Terminal Pulse Frequency in TERMINAL SELECTION PARAMETERS group. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 58](#) The following are some other ways of configuring a master/follower. See Application Guideline 11 for information on trimming the slaves. Master Follower Follower 4-20 mA 2-10 Master Follower Follower For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 59: Independent Dancer Control](#)

Independent Dancer Control Introduction The G3's dancer can be configured to act in two ways: independent of a master line reference (unlimited frequency adjustment) or as a trim off of a master line reference (max +/- 12.5% trim). This guideline will discuss an application in which the drive changes motor speed (via a internal PID) to maintain dancer position independent of any master line speed reference the drive is getting.

[Page 60](#) 2.5 volts and decrease its output frequency whenever the dancer voltage is above 2.5 volts. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 61](#) THE SPEED REFERENCE IS ZERO (make sure the RR or IV terminals or other frequency reference source are commanding at least 0.01 Hz. The actual value does not matter). For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 62: Trim Dancer Control](#)

Trim Dancer Control Introduction The G3's dancer can be configured to act in two ways : independent of a master line reference (unlimited frequency adjustment) or as a trim off of a master line reference (+/- 12.5% trim max). This guideline will discuss the application of a

dancer that trims the drive's output frequency around a master line reference.

[Page 63](#) 4 decimal). Process dancer control is turned on by setting the leftmost bit to '1', so the new BCD values will be 1110 0100, which is E4 in hex. Use the up arrow to adjust the 64 to read E4. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 64](#) Remove and re-apply main power to the drive after the above programming is finished The G3 can be programmed to change the state of one of its output contacts based on dancer travel by programming PID Deviation Upper Limit and PID Deviation Lower Limit in the FEEDBACK PARAMETERS group and programming '38'...

### [Page 65: 120 Hz Constant Torque Operation Of A 60 Hz Motor](#)

120 Hz Constant Torque Operation of a 60 Hz Motor The G3's adjustable volts/hertz relationship and high frequency capability can be utilized in applications that require a 1:2 constant torque speed range or that have limited space available for the motor.

[Page 66](#) 100HP, 460V, 405TS frame, 3600 RPM, 120 amps (will be run up to 480V 60 Hz 3600 RPM) A 100 HP G3 would be used with either motor. Notice that the 50 HP motor is in a smaller frame. Programming...

### [Page 67: Overspeed](#)

230 volts at 30 Hz to allow the motor to develop its rated torque at half speed. Many users would like to run motors at speeds higher than the motor design speed. The G3 has no problem outputting up to 400 Hz (contact Inverter Marketing for information on 800 Hz operation). Over 60 Hz, however, the G3 cannot "make"...

[Page 68](#) A 3 HP 460 volt G3 was used to run a 3 HP TEFC 4 pole EQP3 at 60, 90, 120, and 150 Hz. At rated motor current, the following maximum continuous torques were developed: Actual % Full-Load Torque Predicted % Full-Load Torque As motor RPM increases: The torque required to overcome bearing friction increases at the same rate.

[Page 69](#) Therefore, the motor cannot provide constant HP at up to 300 Hz. In fact, the maximum HP the motor can develop at 300 Hz is:  $HP = \text{Torque} \times RPM = 1.08 \times 9000 = 1.85 \text{ HP}$  5250 5250 For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 70: Drooping](#)

$\text{Droop Frequency} = \text{MAXIMUM OUTPUT FREQUENCY} \times \text{DROOPING CONTROL AMOUNT} \times \text{Torque Ratio}$   
 $\text{Torque Ratio (max 200\%)} = \text{instantaneous actual torque} / \text{rated torque} \times \text{adjusted on site.}$   
See page 2 for procedure. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 71](#) Contact drive marketing for information on how to increase droop amount larger than 10%. Contact drive marketing for information concerning positive droop. Common Frequency Reference The drives used in a drooping system share a frequency reference; use the G3's RS485 master/follower board (see application guideline) or provide identical references.

### [Page 72: Carrier Frequency Derating](#)

The following software limit curve applies to all G3's 100HP and smaller: Carrier Frequency Derate 100HP & Smaller Carrier Frequency For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 73](#) Prior to increasing carrier frequencies on a drive, it is best to consult with the factory to make sure that the proper decision is being made. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 74: Load Sharing Application](#)

Load Sharing Application The following application is a description of two G3 Plus Packs on a mining coal conveyer where the drive is required to load share two 300HP motors using

separate drives. 300 HP MOTOR 300 HP MOTOR MAIN DRIVE...

[Page 75](#) • System runs 10% lighter load with coal than without indicating a slight decline. • Conveyor coasts about 10-12 seconds before stopping when the drive is turned off. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 76: Tosline F10 Communications With G3 Inverter And T2 Plc](#)

LW012: Frequency of G3. Sent by T2. Enter as Hz \* 100. LW013: Command bit table of G3: Sent by T2. Turn on bit 0 to run drive. See below. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-...

[Page 77](#) Super User Mode: Using the G3's super user mode, one of the four monitored parameters from the previous page can be replaced with any one other parameter in the G3. And any one additional G3 parameter can be sent by the PLC to the G3.

[Page 78](#) 42645--9/16". When using the above super user mode settings, at least 6 LW registers will be used by the G3. Even if a parameter is not being monitored, zero will be stored in the register. Therefore, if it is necessary to minimize the number of LW registers used by the G3, do not add parameters by super user mode, and reduce the value of F10 Monitor Output and/or F10 Command Input.

### [Page 79: Toshiba S20 Fiber Optics Communication](#)

Toshiba S20 Fiber Optics Communication Introduction This communication network enables the G3 to be integrated into your control system. Tosline S20 provides a very high speed (2 Mbaud), noise immune (fiber optic) connection. Tosline S20 supports 1024 Registers across 64 stations.

[Page 80](#) Finally, in the first I/O Allocation sub-menu enter Network Assignment (N) and set all Channel 1 settings for TL-S to LINK. Save settings by writing them to EEPROM (F3). For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

[Page 81](#) Before continuing further, the rotary switches must be set on the S-20 module of the T2 and the S-20 option card of the G3. The lowest station must be the T2. For example, set it to '01'. The G3 can then be set to '02'.

[Page 82](#) % Set the TOSLINE-S20 Receiving Address and TOSLINE-S20 Sending Address to the start address specified previously in the S-LS system. Set-up is from the perspective of the G3 drive. The receiving address is the start address that the T2 talks to, and the sending address is the start address which the G3 talks to, (ie using the previous example table, 40 and 0 respectively).

[Page 83](#) Sending/Receiving Data Status Bit Register When reading the status address from the G3, decode the register using the following table: stop stop reverse rotation forward rotation acc/dec #1 acc/dec #2 not used (keep at 0) failed gate block normal not used...

[Page 84](#) Command Bit Table When sending a command status to the G3 address, (ie W0040) use the following table: stop not used (keep at 0) reverse rotation normal rotation acc/dec #1 acc/dec #2 4 to 6 not used normal run jog run...

[Page 85](#) 0: 0=stop / 1=run bit 1: not used bit 2: 0=forward / 1=reverse ... etc) W0042 Speed Command Value (multiplied by 1000, refer to monitor output) For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

### [Page 86: Changing The G3 Lcd Display To German](#)

Select GERMAN from the menu that appears. Other language options also appear on this menu, but the only languages implemented at this time are German and English. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872- 2192...

