Profibus DP
Expansion Board

Catalog No. EXBD04

Installation and Operating Manual

10/02 **MN1393**

Table of Contents

Section 1
General Information

Introduction The Profibus DP expansion board provides communications so ASDs (adjustable speed drives) can be linked together to form a network. Using a central PLC (Programmable Logic Controller) or PC based control system, this network can be continuously controlled to provide supervision and monitoring for each ASD in the system. All ASDs can be set–up using the keypad of one control, or connection to WorkbenchD.

Limited Warranty

For a period of one (1) year from the date of original purchase, BALDOR will repair or replace without charge controls and accessories which our examination proves to be defective in material or workmanship. This warranty is valid if the unit has not been tampered with by unauthorized persons, misused, abused, or improperly installed and has been used in accordance with the instructions and/or ratings supplied. This warranty is in lieu of any other warranty or guarantee expressed or implied. BALDOR shall not be held responsible for any expense (including installation and removal), inconvenience, or consequential damage, including injury to any person or property caused by items of our manufacture or sale. (Some states do not allow exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply.) In any event, BALDOR's total liability, under all circumstances, shall not exceed the full purchase price of the control. Claims for purchase price refunds, repairs, or replacements must be referred to BALDOR with all pertinent data as to the defect, the date purchased, the task performed by the control, and the problem encountered. No liability is assumed for expendable items such as fuses.

Goods may be returned only with written notification including a BALDOR Return Authorization Number and any return shipments must be prepaid.

Safety Notice

This equipment contains voltages that may be as great as 1000 volts! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.

This equipment may be connected to other machines that have rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.

PRECAUTIONS

⚠ **WARNING: Do not touch any circuit board, power device or electrical connection before you first ensure that power has been disconnected and there is no high voltage present from this equipment or other equipment to which it is connected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.**

⚠ **WARNING: Be sure that you are completely familiar with the safe operation of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.**

⚠ **WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury.**

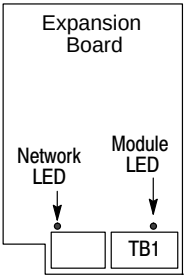
⚠ **WARNING: Do not remove cover for at least five (5) minutes after AC power is disconnected to allow capacitors to discharge. Dangerous voltages are present inside the equipment. Electrical shock can cause serious or fatal injury.**

⚠ **WARNING: Improper operation of control may cause violent motion of the motor shaft and driven equipment. Be certain that unexpected motor shaft movement will not cause injury to personnel or damage to equipment. Peak torque of several times the rated motor torque can occur during control failure.**

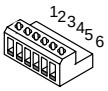
⚠ **WARNING: Motor circuit may have high voltage present whenever AC power is applied, even when motor is not rotating. Electrical shock can cause serious or fatal injury.**

The physical installation of the expansion board into the control is described in the installation and operation manual for the control. Refer to the control manual for further details.

Figure 2-1 Expansion Board Layout



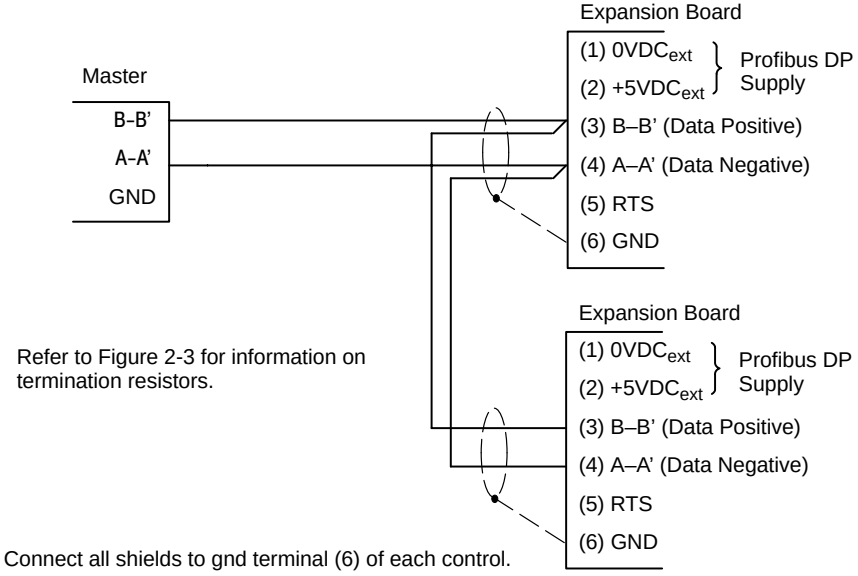
Tightening Torque is 0.5 lb–in (0.6Nm)



TB1 Modular Connector

TB1	Description
1	$0VDC_{ext}$
2	$+5VDC_{ext}$ @50mA
3	B–B' (Data+)
4	A–A' (Data –)
5	RTS (Repeater TTL)
6	GND

Figure 2-2 Connection Example



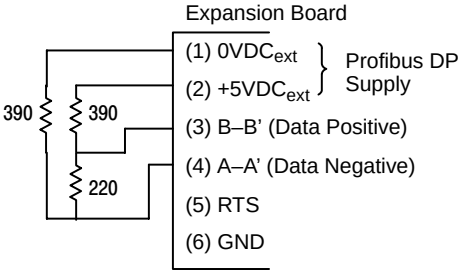
Refer to Figure 2-3 for information on termination resistors.

Connect all shields to gnd terminal (6) of each control.

Refer to the manual for the master device for cable requirements, termination, maximum cable lengths and other critical information.

Refer to the manual for the Profibus Master device for detailed information and specifications for termination and cable requirements. A general Profibus termination example is provided in Figure 2-3. Only the last control in the network should have termination resistors.

Figure 2-3 Termination



Cable and Termination resistor specifications are provided in the manual for the Profibus Master device.

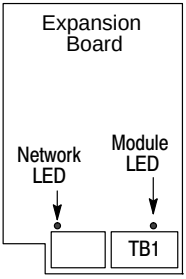
Power Off Checks

1. Verify the expansion board is correctly installed in the control. See Section 2.
2. Verify the termination resistors are installed correctly. See Section 2.
3. Verify cable connections are correct. See Section 2.

Powerup The covers may remain off to view the LED's. LED activity is described in Figure 3-1. When the Profibus DP expansion board is powered up it will do the following:

1. Perform a self test.
2. Verify communications.
3. Verify parameter settings for configuration.
4. Ready to go online.

Figure 3-1 LED Description



Network LED	Description
Off	Disabled or baud search.
Short Flash	Wait parameterization.
Flash	Wait configuration.
Long Flash	Data exchange with error.
On	Data exchange.

Module LED	Description
Off	Hardware fault – external.
Short Flash	Hardware fault – internal.
Flash	Wrong "Type" or disabled.
Long Flash	Setup fault, wrong parameter value(s).
On	Ready for operation.

Note: The Network LED can only be ON when the Module LED is On continuously, indicating that the board is ready for communications. If the Module LED is not On continuously, the Network LED will be Off or flashing.

Initial Set–up for Profibus DP

Parameter settings for the Profibus DP option can be set from the Keypad or WorkbenchD. Refer to the control manual for keypad instructions or MN794 for WorkbenchD.

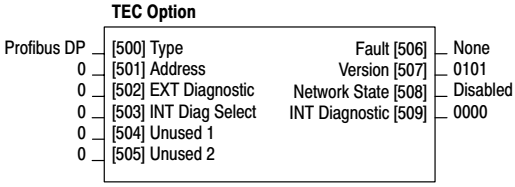
Note: When setting values for parameters from WorkbenchD you are able to select any value in the parameter's range, i.e. –32768 to 32767. If the value is incorrect, i.e. it doesn't correspond to a value that can be set using the keypad, then the Fault output parameter will be set to Parameter.

29D & 30D Configuration

When Type [500] is set to Profibus DP, the parameter choices are as shown.

1 SERIAL LINKS

2 TEC OPTIONS
- Type
- Address
- EXT Diagnostic
- INT Diag. Select
- Unused 1
- Unused 2
- Fault
- Version
- Network State
- INT Diagnostic



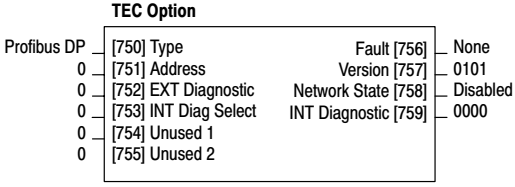
38D Configuration

When Type [750] is set to Profibus DP, the parameter choices are as shown.

1 SETUP

2 COMMUNICATIONS

3 TEC OPTION
- Type
- Address
- EXT Diagnostic
- INT Diag. Select
- Unused 1
- Unused 2
- Fault
- Version
- Network State
- INT Diagnostic



Initial Set–up for Profibus DP Continued

TYPE (Expansion Board Type)
Sets the type of expansion board being used.

Range: 0 : None
1 : RS485/Modbus
2 : Profibus
3 : Type 3
4 : Device Net
5 : Type 5
6 : Type 6
7 : Type 7
8 : Type 8
9 : Type 9
10 : Type 10
11 : Type 11
12 : Type 12
13 : Type 13
14 : Type 14
15 : Type 15

Address
The PROFIBUS slave address. Note that addresses 0, 1 and 2 are usually reserved for PROFIBUS Masters and so should be avoided.

Range: 0 to 125

EXT Diagnostic
(External Diagnostic) The value of this parameter appears as the 2nd and 3rd bytes of the application specific diagnostics to the master. Refer to "PROFIBUS Diagnostics". This provides a simple way to implement user defined trips or exceptions.

Range: 0 to FFFF

INT DIAG Select
(Internal Diagnostic Select) Refer to "Internal Diagnostics", Section 4.

Range: 0 to 29999

UNUSED 1 & 2
Reserved for future use.

Range: 0 to FFFF

Fault
The communication fault status within the Profibus DP option.

Range: 0 to 5

0 : None	no faults
1 : Parameter	parameter out–of–range
2 : Type Mismatch	Type parameter not set to DeviceNet
3 : Self Test	hardware fault – internal
4 : Hardware	hardware fault – external
5 : Missing	no option installed

Version
The version of the expansion board. If no expansion board is installed the version is reset to zero.

Range: 0000 to FFFF

Initial Set–up for Profibus DP Continued

NETWORK STATE
The network state of the expansion board. See also "Network and Module LED Indications".

Range: 0 : Data Exchange
1 : Data Ex Error
2 : Wait Config
3 : Wait Param
4 : Baud Search
5 : Disabled

DATA EXCHANGE
Data Exchange mode. The parameterization and configuration have been accepted and the slave is exchanging user data with the master.

DATA EX ERROR
Data Exchange mode, as above, but with read/write error(s). This indicates that at least one of the parameters being read or written is failing, for example writing a value out of range.

WAIT CONFIG
Waiting for configuration. The parameterization from the master has been accepted and is now waiting for the Master to send valid configuration data.

WAIT PARAM
Waiting for parameterization. The slave has detected communications at a valid baud rate and is waiting for the master to send valid parametrisation data.

BAUD SEARCH
The slave has not detected valid communications.

DISABLED
The interface is disabled. The reason for this is given by the FAULT parameter.

INT DIAGNOSTIC
Refer to "Internal Diagnostics", Section 4.

Range: 0000 to FFFF

Profibus DP Configuration

The expansion board is a Slave device using the predefined master/slave connection set. Other than setting the TEC Option Type and Address within the Drive, all configuration is done at the Profibus DP Master. Refer to the manual for the Profibus DP Master Configuration Tool.

GSD File The GSD files are provided on floppy diskette with the expansion board. The GSD file must be installed to allow communication with the Profibus DP master. Use the Profibus DP Master Configuration Tool to install the GSD file.

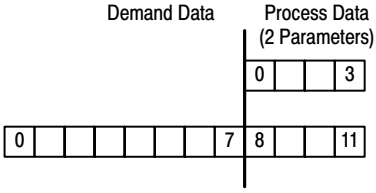
Configuration Data (Cfg_Data)

The Configuration Data (Cfg_Data) is used to specify the number of parameters that are to be read and written as part of the cyclic Data Exchange. The Data Exchange either consists of just Process Data, or Demand Data and Process Data.

Demand Data is 8 reserved bytes to support a messaging system, allowing random access to any drive parameter.

OR

Process Data is the fixed set of parameters that are to be transferred each cycle.



To enable the Demand Data feature, the first byte of Cfg_Data is set to 0x73 (115 decimal). The number of Inputs and Outputs in the Process Data is defined by setting bytes to either 0x50 (80 decimal), 0x60 (96 decimal) or 0x70 (112 decimal). The maximum number of Process Data parameters is 30.

Index (No Demand Data)	Index (With Demand Data)	Identifier Byte (Hexadecimal)	Action
	0	0x73	Enable data demand.
0	1	0x50	Read 1st parameter.
		0x60	Write 1st parameter.
		0x70	Read/Write 1st parameter.
1	2	0x50	Read 2nd parameter.
		0x60	Write 2nd parameter.
		0x70	Read/Write 2nd parameter.
. . .	. . .	. . .	. . .
29	30	0x50	Read 30th parameter.
		0x60	Write 30th parameter.
		0x70	Read/Write 30th parameter.

Example:

Index	Data	Description
0	0x60	1st Parameter output (no demand data)
1	0x50	2nd parameter output
2	0x50	3rd parameter input
3	0x50	4th parameter input

The Identifier Byte formats have the following meaning:

Identifier	Input/Output	Length	Format	Consistency
0x50	Input	1	Word	None
0x60	Output	1	Word	Word
0x70	Input – Output	1	Word	Word
0x73	In and Out	4	Word	Word

Note: All parameter values are transferred as Words (two 8 bit bytes).

User Parameter Data (Usr_Prm_Data)

The Usr_Prm_Data specifies the Tag numbers of the parameters that are to be read or written as Process Data. Each parameter is represented by 2 bytes in the Usr_Prm_Data, these specify the Tag number in High–Byte/ Low–Byte order. The first 3 bytes of the Usr_Prm_Data are reserved for the future implementation on the DPV1 Profibus extensions. These must be set to zero. The High–Byte of the first Tag number must be in the 4th byte.

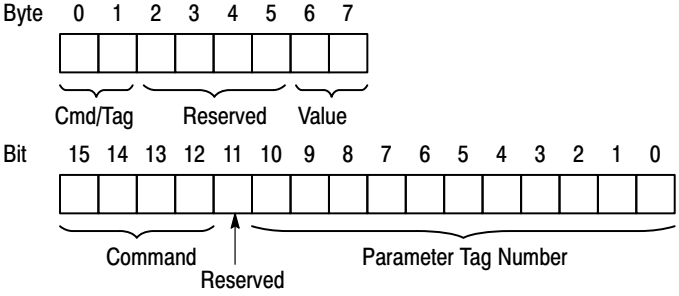
The Usr_Prm_Data may be up to 63 Bytes long. If less than 63 Bytes are sent, the length must be 3 x 2n, where n is a number between 0 and 30. Unused Bytes must be set to zero and must be at the end of the Tag declarations. The number of Tags declared must match the number of Inputs, Outputs and Input–Outputs declared to be in the Process Data by the Cfg_Data.

Index	Data	Parameter
0	Reserved for DPV1	
1	Reserved for DPV1	
2	Reserved for DPV1	
3	High-Byte	1st [Tag]
4	Low-Byte	
5	High-Byte	2nd [Tag]
6	Low-Byte	
. . .	. . .	. . .
61	High-Byte	30th [Tag]
62	Low-Byte	

Demand Data Protocol

Demand Data is a sub–protocol using the first 8 bytes in both the request and response message of the cyclic Data Exchange. It allows random read/write access to any parameter within the Drive. It is enabled by the Profibus–DP– Master setting the first byte of the Cfg_Data to 0x73. The sub–protocol consists of 3 parts:

- Command
- Parameter Reference (Tag Number)
- Parameter Value or Error Code



Command

The Command field in the request message sets the operation; None, Read or Write. The Command field in the response message either confirms that no operation has been requested, indicates that a Read or Write request has been completed successfully or indicates that a Read or Write request has failed.

Valid values for the Command field are:

Command	Request (Master to Slave)	Response (Slave to Master)
0	No command	Acknowledge No command
1	Read request	Acknowledge transfer
2	Write request	
7		Reject request

Valid Request/Response command pairs are:

Request (Master to Slave)	Response (Slave to Master)
0	0
1	1 or 7
2	1 or 7

Parameter Reference [Tag Number]

The Parameter Tag Number is the unique reference to a parameter within the Drive. These are listed in the Product Manual.

Parameter Value or Error Code
The Value/Error Code field is used to receive a Read value, send a Write value or receive an error code. The Value is a signed or unsigned 16–bit integer. The scaling for each parameter is described in the Product Manual for the host Drive. If the Response Command is 7, i.e. the request has been rejected, this field contains the error code.
These are:

Error Code	Description
0	Invalid tag number
1	Read only parameter
2	Value under range or over range

Data Encoding
All parameter values are transferred in the Data Exchange packet as 2 byte Words. The most significant byte is transmitted first.

Type	Decimal Value	Transmitted Value (Hexadecimal)
INT	300.00	7530
INT	-300.00	8AD0
BOOL	False	0000
BOOL	True	0001

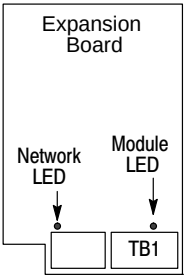
Note: The decimal point is not transmitted. Refer to the product manual for scaling information.

Trip The Profibus DP expansion board cannot report the nature of the drive trip. The value contained in bits 0 to 4 have the following meaning:
0 (0000) = No Trip; 31 (1111) = Drive Tripped

Section 4
Troubleshooting

Two LEDs report the status of the DeviceNet expansion board.

Figure 4-1 LED Description



Network LED	Description
Off	Not ready, no power.
Short Flash	Failed communication tests.
Flash	Device has been on-line but has gone off-line.
Long Flash	Device is on-line but has no established connections.
On	Link is Ready for operation and has established connections.

Module LED	Description
Off	Not ready, no power.
Short Flash	Unrecoverable fault; it may need to be replaced.
Flash	Recoverable fault.
Long Flash	Invalid configuration. Set parameters correctly.
On	Ready for operation.

Note: The Network LED can only be ON when the Module LED is On continuously, indicating that the board is ready for communications. If the Module LED is not On continuously, the Network LED will be Off on flashing.

Table 4-1 Module LED

Module LED	Possible Cause	Corrective Action
	No power at the drive.	Check and apply power to the drive.
	Expansion board not installed correctly.	Check connections between expansion board and drive.
	Hardware fault.	If Health and Run LEDs are Off, replace the drive, else replace the expansion board.
	Expansion board self test failed.	Replace the expansion board.
	Wrong expansion board installed or selected.	Install the correct expansion board or select the matching value for the TYPE parameter in the TEC OPTION function block. (TYPE = DeviceNet). Remember to toggle Refresh Inputs (True to False).
	Set-up fault. A TEC OPTION parameter is out-of-range.	Select the correct value for the parameter in the TEC OPTION function block. Remember to toggle Refresh Inputs (True to False).
	Profibus DP is operating normally.	None required.

Table 4-2 Network LED

Network LED	Possible Cause	Corrective Action
	Not ready.	See Module LED corrective actions.
	Waiting for valid parameter data.	Verify the slave address is correct and unique.
		Ensure network connections are correct.
		Verify the configuration has been uploaded to the master.
		Verify the GSD file being used is the correct file.
	Waiting for valid configuration data.	Refer to Internal Diagnostics.
	Read/Write failure.	Refer to Internal Diagnostics.
	Link is ready for operation.	None required.

Internal Diagnostics

Two parameters of the TEC OPTION function block provide diagnostic information:

1. The area the problem is in is indicated by the Network State parameter (and the Technology Option's LEDs).
2. The INT Diagnostic parameter allows access to internal network diagnostic information. (The INT DIAG Select parameter selects the information to output as the INT Diagnostic parameter).

INT DIAG SELECT Parameter Values

0	Slave Configuration error. Used when stuck in the WAIT PARAM or WAIT CONFIG states.	
	0000	No error.
	0012	Parameterization telegram too long.
	0013	Parameterization telegram is a bad length. If User-Prm_Data is present, it must be of length 3 +2n, where n is a value 0 to 30.
	0014	The list of tag numbers in the Usr-Prm-data contains a zero. Zero Tag numbers are only allowed at the end of the list.
	0021	The Configuration telegram is of zero length.
	0022	The Configuration telegram is too long. The maximum length is 31, i.e. configuration for 30 inputs, outputs or input-outputs, plus Demand Data.
	0023	The Configuration telegram contains an unsupported identifier byte. See Configuration Data section.
	0024	The Configuration telegram contains too few identifier bytes. Excluding the Demand Data identifier byte, if present, they must match the quantity of Tags declared in the parameterization packet.
	0025	The Configuration telegram contains too many identifier bytes.
100 to 129	Displays Tag number (in hexadecimal) of parameter 0 to 29, e.g. setting INT DIAG SELECT to 101 will show the Tag number of the 2nd parameter.	
200 to 229	Displays access mode for parameter 0 to 29.	
	0001	Input to master, i.e. (read).
	0002	Output from master, (write).
	0003	Input and output, i.e. both read and write.
300 to 329	Displays access error for parameter 0 to 29.	
	0000	No error.
	0001	Data out of range. The value being written by the master is either less than the low limit or greater than the high limit for the specified parameter.
	0002	Read only. The master is attempting to write to a read-only parameter.
	0003	Not Stop mode. The master is attempting to write to a parameter which can only be updated when the drive is in the Stop mode, but it is in the Run mode.
	0004	Not Configuration mode. The master is attempting to write to a parameter which can only be updated when the drive is in the Configuration mode, but it is in the normal operating mode.
	0005	Unsupported type. The master is attempting to read or write a parameter of a type which is not supported by this implementation of the Profibus, i.e. type STRING.
	0006	Invalid Tag number. The master is attempting to read or write a parameter that does not exist.
400 to 429	Displays last read value (in hexadecimal) for parameter 0 to 29.	
500 to 529	Displays last write value (in hexadecimal) for parameter 0 to 29. Note – 0000 if never written to by master.	

Table 4-3 Decimal / Hexadecimal Values

	0	1	2	3	4	5	6	7	8	9
0	0000	0001	0002	0003	0004	0005	0006	0007	0008	0009
10	000A	000B	000C	000D	000E	000F	0010	0011	0012	0013
20	0014	0015	0016	0017	0018	0019	001A	001B	001C	001D
30	001E	001F	0020	0021	0022	0023	0024	0025	0026	0027
40	0028	0029	002A	002B	002C	002D	002E	002F	0030	0031
50	0032	0033	0034	0035	0036	0037	0038	0039	003A	003B
60	003C	003D	003E	003F	0040	0041	0042	0043	0044	0045
70	0046	0047	0048	0049	004A	004B	004C	004D	004E	004F
80	0050	0051	0052	0053	0054	0055	0056	0057	0058	0059
90	005A	005B	005C	005D	005E	005F	0060	0061	0062	0063
100	0064	0065	0066	0067	0068	0069	006A	006B	006C	006D
110	006E	006F	0070	0071	0072	0073	0074	0075	0076	0077
120	0078	0079	007A	007B	007C	007D	007E	007F	0080	0081
130	0082	0083	0084	0085	0086	0087	0088	0089	008A	008B
140	008C	008D	008E	008F	0090	0091	0092	0093	0094	0095
150	0096	0097	0098	0099	009A	009B	009C	009D	009E	009F
160	00A0	00A1	00A2	00A3	00A4	00A5	00A6	00A7	00A8	00A9
170	00AA	00AB	00AC	00AD	00AE	00AF	00B0	00B1	00B2	00B3
180	00B4	00B5	00B6	00B7	00B8	00B9	00BA	00BB	00BC	00BD
190	00BE	00BF	00C0	00C1	00C2	00C3	00C4	00C5	00C6	00C7
200	00C8	00C9	00CA	00CB	00CC	00CD	00CE	00CF	00D0	00D1
210	00D2	00D3	00D4	00D5	00D6	00D7	00D8	00D9	00DA	00DB
220	00DC	00DD	00DE	00DF	00E0	00E1	00E2	00E3	00E4	00E5
230	00E6	00E7	00E8	00E9	00EA	00EB	00EC	00ED	00EE	00EF
240	00F0	00F1	00F2	00F3	00F4	00F5	00F6	00F7	00F8	00F9
250	00FA	00FB	00FC	00FD	00FE	00FF	0100	0101	0102	0103
260	0104	0105	0106	0107	0108	0109	010A	010B	010C	010D
270	010E	010F	0110	0111	0112	0113	0114	0115	0116	0117
280	0118	0119	011A	011B	011C	011D	011E	011F	0120	0121
290	0122	0123	0124	0125	0126	0127	0128	0129	012A	012B
300	012C	012D	012E	012F	0130	0131	0132	0133	0134	0135
310	0136	0137	0138	0139	013A	013B	013C	013D	013E	013F
320	0140	0141	0142	0143	0144	0145	0146	0147	0148	0149
330	014A	014B	014C	014D	014E	014F	0150	0151	0152	0153
340	0154	0155	0156	0157	0158	0159	015A	015B	015C	015D
350	015E	015F	0160	0161	0162	0163	0164	0165	0166	0167
360	0168	0169	016A	016B	016C	016D	016E	016F	0170	0171
370	0172	0173	0174	0175	0176	0177	0178	0179	017A	017B
380	017C	017D	017E	017F	0180	0181	0182	0183	0184	0185
390	0186	0187	0188	0189	018A	018B	018C	018D	018E	018F

Table 4-3 Decimal / Hexadecimal Values Continued

	0	1	2	3	4	5	6	7	8	9
400	0190	0191	0192	0193	0194	0195	0196	0197	0198	0199
410	019A	019B	019C	019D	019E	019F	01A0	01A1	01A2	01A3
420	01A4	01A5	01A6	01A7	01A8	01A9	01AA	01AB	01AC	01AD
430	01AE	01AF	01B0	01B1	01B2	01B3	01B4	01B5	01B6	01B7
440	01B8	01B9	01BA	01BB	01BC	01BD	01BE	01BF	01C0	01C1
450	01C2	01C3	01C4	01C5	01C6	01C7	01C8	01C9	01CA	01CB
460	01CC	01CD	01CE	01CF	01D0	01D1	01D2	01D3	01D4	01D5
470	01D6	01D7	01D8	01D9	01DA	01DB	01DC	01DD	01DE	01DF
480	01E0	01E1	01E2	01E3	01E4	01E5	01E6	01E7	01E8	01E9
490	01EA	01EB	01EC	01ED	01EE	01EF	01F0	01F1	01F2	01F3
500	01F4	01F5	01F6	01F7	01F8	01F9	01FA	01FB	01FC	01FD
510	01FE	01FF	0200	0201	0202	0203	0204	0205	0206	0207
520	0208	0209	020A	020B	020C	020D	020E	020F	0210	0211
530	0212	0213	0214	0215	0216	0217	0218	0219	021A	021B
540	021C	021D	021E	021F	0220	0221	0222	0223	0224	0225
550	0226	0227	0228	0229	022A	022B	022C	022D	022E	022F
560	0230	0231	0232	0233	0234	0235	0236	0237	0238	0239
570	023A	023B	023C	023D	023E	023F	0240	0241	0242	0243
580	0244	0245	0246	0247	0248	0249	024A	024B	024C	024D
590	024E	024F	0250	0251	0252	0253	0254	0255	0256	0257
600	0258	0259	025A	025B	025C	025D	025E	025F	0260	0261
610	0262	0263	0264	0265	0266	0267	0268	0269	026A	026B
620	026C	026D	026E	026F	0270	0271	0272	0273	0274	0275
630	0276	0277	0278	0279	027A	027B	027C	027D	027E	027F
640	0280	0281	0282	0283	0284	0285	0286	0287	0288	0289
650	028A	028B	028C	028D	028E	028F	0290	0291	0292	0293
660	0294	0295	0296	0297	0298	0299	029A	029B	029C	029D
670	029E	029F	02A0	02A1	02A2	02A3	02A4	02A5	02A6	02A7
680	02A8	02A9	02AA	02AB	02AC	02AD	02AE	02AF	02B0	02B1
690	02B2	02B3	02B4	02B5	02B6	02B7	02B8	02B9	02BA	02BB
700	02BC	02BD	02BE	02BF	02C0	02C1	02C2	02C3	02C4	02C5
710	02C6	02C7	02C8	02C9	02CA	02CB	02CC	02CD	02CE	02CF
720	02D0	02D1	02D2	02D3	02D4	02D5	02D6	02D7	02D8	02D9
730	02DA	02DB	02DC	02DD	02DE	02DF	02E0	02E1	02E2	02E3
740	02E4	02E5	02E6	02E7	02E8	02E9	02EA	02EB	02EC	02ED
750	02EE	02EF	02F0	02F1	02F2	02F3	02F4	02F5	02F6	02F7
760	02F8	02F9	02FA	02FB	02FC	02FD	02FE	02FF	0300	0301
770	0302	0303	0304	0305	0306	0307	0308	0309	030A	030B
780	030C	030D	030E	030F	0310	0311	0312	0313	0314	0315
790	0316	0317	0318	0319	031A	031B	031C	031D	031E	031F

Table 4-3 Decimal / Hexadecimal Values Continued

	0	1	2	3	4	5	6	7	8	9
800	0320	0321	0322	0323	0324	0325	0326	0327	0328	0329
810	032A	032B	032C	032D	032E	032F	0330	0331	0332	0333
820	0334	0335	0336	0337	0338	0339	033A	033B	033C	033D
830	033E	033F	0340	0341	0342	0343	0344	0345	0346	0347
840	0348	0349	034A	034B	034C	034D	034E	034F	0350	0351
850	0352	0353	0354	0355	0356	0357	0358	0359	035A	035B
860	035C	035D	035E	035F	0360	0361	0362	0363	0364	0365
870	0366	0367	0368	0369	036A	036B	036C	036D	036E	036F
880	0370	0371	0372	0373	0374	0375	0376	0377	0378	0379
890	037A	037B	037C	037D	037E	037F	0380	0381	0382	0383
900	0384	0385	0386	0387	0388	0389	038A	038B	038C	038D
910	038E	038F	0390	0391	0392	0393	0394	0395	0396	0397
920	0398	0399	039A	039B	039C	039D	039E	039F	03A0	03A1
930	03A2	03A3	03A4	03A5	03A6	03A7	03A8	03A9	03AA	03AB
940	03AC	03AD	03AE	03AF	03B0	03B1	03B2	03B3	03B4	03B5
950	03B6	03B7	03B8	03B9	03BA	03BB	03BC	03BD	03BE	03BF
960	03C0	03C1	03C2	03C3	03C4	03C5	03C6	03C7	03C8	03C9
970	03CA	03CB	03CC	03CD	03CE	03CF	03D0	03D1	03D2	03D3
980	03D4	03D5	03D6	03D7	03D8	03D9	03DA	03DB	03DC	03DD
990	03DE	03DF	03E0	03E1	03E2	03E3	03E4	03E5	03E6	03E7

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