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Technical Manual

***SMART TRAC<sup>TM</sup> AC1***  
***Fault Tables***

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Faults.doc

Rev. # 19 Page 1 of 64

Title: Fault Declarations

REV	DATE	NAME	DESCRIPTION
0	04/23/98	J. Muszynski	Original.
1	08/21/98	D. W. Karraker	Split driver fault codes among known I/O drivers. Added sub-heading listing DPRAM faults.
2	12/04/98	D. W. Karraker	Updated DPRAM and PCU faults
3	12/04/98	M. DuVal	Added faults for PG-SC. Added cross reference column as to the actual error number shown in Smart Trac Workstation SW
4	01/26/99	J. Cretney	Added displayed fault codes to fault # 30016 through 30047
5	02/27/99	M. DuVal	Added Smart Trac LAN fault table.
6	03/05/99	J. Cretney	Merged C-Function Block Fault descriptions. Added decimal representation of fault codes.
7	03/22/99	M. DuVal	Added more Smart Trac LAN fault codes.
8	03/23/99	T. Wiese	Change LAN allocation errors from output to I/O
9	08/04/99	M. DuVal	Added Operating System faults, Fault Range Map, and Document Revision. Removed unused sections. Reformatted fault tables. Corrected documentation errors.
10	08/18/99	M. DuVal	Include revisions from document design review. Added columns: Corrective Action and Assign Program Inputs.
11	09/10/99	T. Ellis	Changed Assign Program Inputs to reflect correct values. Provided information for Corrective Actions. Document clarification and corrections.
12	12/16/99	S. Mack	Added new faults being declared by Function Blocks in MAG_WIND_V1_9 and MAG_STD_V1_9. Added to the explanations of fault types.
13	12/20/99	D. W. Karraker	Added individual CPF and OPE faults under Inverter Faults
14	01/05/00	M. DuVal	Renamed references of MAG_CPB_V1_9 to MAG_STD_V1_9. Revised fault definitions in Function Blocks section specific to MAG_STD_V1_9 library.
15	01/11/00	D. W. Karraker	Added revision number for DPRAM driver to section 1.2
16	01/12/00	M. DuVal	Minor changes to Function Blocks section.
17	01/31/00	D. W. Karraker	Added inverter alarm codes
18	04/03/00	J. Nickel	Added 2 fields to each fault code to indicate which list(s) the fault will be placed in by default: OLDEST or NEWEST. Also added a column to indicate if the fault is considered a PRIORITY fault by default. Changed the description of fault #77643 (CAVE Input). Changed legends of event codes 95736-95755 to include "Alm:". Revised many of the Corrective actions which were labeled 'Consult Factory'. Added faults 12B08 – 12B0B, & 12B67. These are new input faults for the DIAM_2, INRT_1, CTCW_0, CTCW_1 and POSR_0 blocks. Corrected some other typos in the document. Added another Program Input called 'FB_Setup' for use to designate improper inputs to various block inputs.
19	05/09/00	S. Mack	DIAM_0 can declare NO_SYSTEM_CLOCK fault. DIAM_2 will declare DIAM_2_INPUT faults if sanity checks are exceeded for NumberCalculation, RatedLineSpeed, S_RPM_at_M_RPM, MinDiameter, and MaxDiameter. Updated Fault Document Revisions.

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10/17/00



*Smart Trac*  
*Product Development*  
*Design Document*

Faults.doc  
Rev. # 19      Page 2 of 64

Title: Fault Declarations

REV	DATE	NAME	DESCRIPTION
20	9/28/00	S. Mack	Added PG_TACH Input fault. Fixed fault 11019 from REFQ to CTCW_1 Input fault.

10/17/00



**Smart Trac**  
*Product Development*  
*Design Document*

Faults.doc  
Rev. # 19      Page 3 of 64

Title: Fault Declarations

**Table of Contents**

<b>1. FAULT NUMBER ASSIGNMENTS</b>	<b>4</b>
1.1 Fault Range Map	6
1.2 Fault Document Revision	7
<b>2. OPERATING SYSTEM</b>	<b>8</b>
<b>3. USER DEFINED FAULTS</b>	<b>20</b>
<b>4. FUNCTION BLOCKS</b>	<b>21</b>
<b>5. DRIVERS</b>	<b>30</b>
5.1 DPRAM Driver	30
5.2 STLAN Driver	33
5.3 Operator Driver	37
<b>6. INVERTER</b>	<b>38</b>
<b>7. IO SUBSYSTEM</b>	<b>59</b>
<b>8. BOOT</b>	<b>64</b>

10/17/00



*Smart Trac*  
*Product Development*  
*Design Document*

Faults.doc

Rev. # 19      Page 4 of 64

Title: Fault Declarations

## 1. Fault Number Assignments

Xycom Automation has allowed MagneTek to use any “internal” fault number, in the range of 0 to 65535, to identify declared faults. (Internal faults are elaborated on below.) This document is meant to assign ranges of numbers to the different aspects of the project, which may need to declare faults. There are a vast number of faults and this should eliminate need for having duplicate fault numbers.

Faults number ranges will be assigned to the following broad categories:

1. Operating System
2. User Defined Faults
3. Function Blocks
4. Communications
5. Drivers
6. Inverter (PCU)
7. Hardware
8. IO Subsystem
9. Boot
10. Future

It shall be the responsibility of software engineers controlling each category to:

1. Further sub-divide the range as they deem appropriate.
2. Keep a common header or include file, under file control, with assigned fault numbers.
3. Keep a Word Document , under file control, defining the fault.

Faults have classification levels called *Severity*. Severity is the level at which a fault should be interpreted by the operating system. When a fault condition is detected, the software that declares the fault also reports its severity. Four types of faults can occur: **major** faults, **minor** faults, **function block setup** faults and **critical** faults.

Major faults can halt execution of the task or node. Most major faults can be manually cleared and the task and node restarted. Major faults stop execution until they are cleared by a task’s program or by the operator. If a major fault is encountered, the fault routine is run and the first thing that the fault routine should do is call G\_FLT (i.e. Get Fault function block) to get the current fault code. Depending on the fault code, it should determine if the system should be shut down or clear the fault and restart execution. Call C\_FLT to clear the fault. Fault clearing can also be done externally by pressing RESET on the Digital Operator. (Typically, automatic clearing of major faults is not recommended. Fault clearing should be initiated by the machine operator.) Major faults cleared by the Control Node Monitor will cause execution to begin from the start of the program. If the Major fault is cleared after executing the fault routine, execution of the function block will restart at the point at which the fault was declared. This very important to understand. For example in a structured text program, if a fault is declared on a certain line, then it is restarted on the following line.

10/17/00



*Smart Trac*  
*Product Development*  
*Design Document*

Faults.doc

Rev. # 19      Page 5 of 64

Title: Fault Declarations

Minor faults are logged, but do not halt the system. Minor faults can be cleared. Minor faults do not cause the task's fault routine to run.

Function block setup faults (FB\_SETUP) are those that indicate at least one input of a function block has been supplied with an illegal input.

Critical faults behave similar to major faults in the fact that execution is halted when a critical fault is encountered. The exception is, a critical fault cannot be cleared nor will the node be allowed to run until node power has been recycled.

The Application Engineer may determine the type of fault (i.e., Major or Minor) only for the User Defined faults. In the other category of faults, the types are predefined and cannot be changed by the Application Engineer.

Faults can be assigned to certain inputs such that the program can react when a fault occurs. These inputs are categorized in this document as *Assign Program Input*<sup>1</sup>.

The Fault Manager I/O Driver has a variable number of logic inputs (BOOLS). Each of these logic inputs will be set true if any of the faults pre-assigned to that logic input is declared. It will remain true until all faults assigned to that input have been reset. Any number of faults may be assigned to any of the inputs. The Fault Manager Interface Card is the mechanism for defining the number of logic inputs, their symbols, and the list of fault codes assigned to that input. The default symbols used in the faults definition document are "Critical", "Major", and "Minor". These symbol names and the faults assigned to them may be changed by the Application Engineer.

Faults can be displayed in up to three places in a Smart Trac AC1 system: twice in Smart Trac AC1 Workstation and once on the Digital Operator. Specifically, the workstation shows fault numbers in two places, a) Fault Manager Interface Card, and b) Control Node Monitor. Unfortunately, the same fault has a different number, depending on whether it is displayed in the Fault Manager or Control Node Monitor. Fault Manager shows the fault in decimal while Control Node Monitor shows the number in hexadecimal. This is a "feature" that was given to us by Xycom Automation. The Digital Operator does not display a fault number rather a *Fault Legend*. All tables in the ensuing sections have cross references for each fault.

Although fault numbers are displayed in Fault Manager and Control Monitor, a third column has been added to many of the tables in this document: *Internal Fault No.* An internal fault number is the number MagneTek development engineers use to identify a fault within a given piece of software and is of no consequence to the Application Engineer. The displayed fault is equal to the internal fault number + 65,536 (i.e. 10000 HEX). Internal fault numbers are not displayed.

<sup>1</sup> Also known as 'Define Outputs' tab in Fault Manager Interface Card of Smart Trac AC1 Workstation software.

Title: Fault Declarations

There are three columns following the description of each fault. These are labeled **Priority Display**, **Newest List** and **Oldest List**. Faults which are selected to be a **Priority Display** will preempt the local operator from whatever it was doing with a display this fault when it happens. Those faults which are selected to be on the **Newest List** (and/or **Oldest List**) will be placed in the 'newest' (or 'oldest') list maintained by the fault manager. The **Newest List** can be thought of as a circular buffer that always contains the newest faults that have been recorded on this drive. Any fault designated as to be placed on the **Newest List** will cause the oldest entry on this circular buffer to be discarded if the **Newest List** already filled to capacity. The **Oldest List** can best be thought of as a table with 20 slots. Any fault designated to be placed on the **Oldest List** will remain on this list until it is cleared via the local operator. If the **Oldest List** already filled up, and a fault designated to be placed on the **Oldest List** occurs, it will NOT be placed on the **Oldest List**. This is done to preserve the fault history of the original event that may have caused many subsequent faults to occur.

### 1.1 Fault Range Map

This table summarizes all possible fault value locations.

Fault Type	Internal Fault Range (Decimal)	Displayed in Control Node Monitor (Hex)	Displayed in Fault Manager Interface Card (Decimal)
Operating System	N/A	0 to FFFF	0 to 65,535
User Defined Faults	00000 to 09999	10000 to 1270F	65,536 to 75,535
<i>Reserved for future use #1</i>	10000 to 10999	12710 to 12AF7	75,536 to 76,535
Function Block Faults	11000 to 11999	12AF8 to 12EDF	76,536 to 77,535
<i>Reserved future Communications Protocols</i>	12000 to 19999	12EE0 to 14E1F	77,536 to 85,535
Driver Faults: DPRAM	20000 to 20099	14E20 to 14E83	85,536 to 85,635
<i>Reserved for future driver #1</i>	20100 to 20199	14E84 to 14EE7	85,636 to 85,735
Driver Faults: STLAN	20200 to 20299	14EE8 to 14F4B	85,736 to 85,835
<i>Reserved for future driver #2</i>	20300 to 20399	14F4C to 14FAF	85,836 to 85,935
Driver Faults: OPERATOR	20400 to 20499	14FB0 to 15013	85,936 to 86,035
<i>Reserved for future driver #3</i>	20500 to 29999	15014 to 1752F	86,036 to 95,535
Inverter Faults	30000 to 39999	17530 to 19C3F	95,536 to 105,535
<i>Reserved for future use #2</i>	40000 to 59999	19C40 to 1EA5F	105,536 to 125,535
<i>Reserved for future hardware platform faults</i>	60000 to 65535	1EA60 to 1FFFFF	125,536 to 131,071
<i>Not Used</i>	N/A	20000 to 8FFFFFFF	131,072 to 2,415,919,103
IO Subsystem	N/A	90000000 to 90000043	N/A

10/17/00



**Smart Trac**  
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Faults.doc

Rev. # 19      Page 7 of 64

Title: Fault Declarations

**1.2 Fault Document Revision**

This table lists the latest version of each fault type. As developers make enhancements that affect faults, they should update the corresponding section and change the Software/Firmware (SW/FW) Version level accordingly. In this way, we can track whether this document has been properly updated.

SW/FW Type	SW/FW Version
ASIC-300 Workstation	4.2.4
Operating System and IO Subsystem (i.e., Kernel and Monitor)	4.2.0
Library: MAG_STD_V1_9	1.9
Library: MAG_WIND_V1_10	1.10
Library: MAG_PG_V1_7	1.7
Driver: DPRAM	1.7
Driver: STLAN	2.4
Driver: OPERATOR	1.10
Smart Trac AC1 Inverter	G112131.DAT (R1) for G5+
	G110200.DAT (R1) for G5 Parallel HP units
Boot	1.2.0

Title: Fault Declarations

## 2. Operating System

The following section details fault numbers assigned to the Smart Trac AC1 Operating System.

Notes:

- Fault legend cannot be changed in this section.
- Internal fault values do not apply here. Operating System faults are not added with 10000 HEX.
- The Severity for every Operating System fault in this section is fixed in firmware. It cannot be changed

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
0	0	<i>Not a fault</i>							
1	1	<i>Not a fault</i>							
2	2	Invalid Opcode	Operand code within program is unrecognized. Valid Opcodes are add, subtract, AND, OR, etc.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
3	3	Stack Overflow	Program pointer has gone past the end of the program stack. Stack is checked at the end of each program scan.	Yes	Yes	Yes	Major	<b>Major</b>	Application program may be overburdened – reduce amount of logic placed in fast Tasks (15ms or faster) to slow Tasks (30ms or slower). This may include reducing number of Program Units and/or program elements.
4	4	Stack Underflow	Program pointer has preceded the beginning of the program stack. Stack is checked at the end of each program scan.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

## Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
5	5	Stack Corrupted	Location of program stack has inadvertently changed. Stack is checked at the end of each program scan.	Yes	Yes	Yes	Major	<b>Major</b>	The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
6	6	Call Underflow	Cannot process next Opcode because a program pointer has preceded the beginning of the program stack.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. Replace the SmartTrac CPU card.
7	7	Call Overflow	Cannot process next Opcode because a program pointer has gone past the end of the program stack.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. Replace the SmartTrac CPU card.
8	8	Task Corrupted	A stack that contains code for each Task to be run is bad.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
9	9	Operand Underflow	A computation is smaller than the smallest quantity the CPU can store.	No	Yes	Yes	Minor	<b>Minor</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

10/17/00



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**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 10 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
A	10	Divide By Zero	An attempt was made to use '0' as a divisor during computation.	No	Yes	Yes	Minor		Software used to create the application program may have been old. (Earlier Kernel and library versions exhibited this problem.) Check the application program for use of zero during division.
B	11	Result Underflow	Floating point error: 1) a computation is smaller than the smallest quantity the CPU can store; 2) An error condition occurred when an item was called from an empty stack.	No	Yes	Yes	Minor	<b>Minor</b>	Check the application program for use of extremely large and/or small numbers for computation.
C	12	Result Overflow	Floating point error: An error occurred when calculated data could not fit within the designated field.	No	Yes	Yes	Minor	<b>Minor</b>	Check the application program for use of extremely large and/or small numbers for computation.
D	13	Invalid Result	Floating point error: Computed result is incorrect or is not within bounds.	No	Yes	Yes	Minor	<b>Minor</b>	Check the application program for use of extremely large and/or small numbers for computation.
E	14	Bad Address Mode	Operand address mode is not recognized. Examples of correct addressing is Direct and Indirect.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

## Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
F	15	Address Mismatch	Address types are not equivalent. This prohibits a valid computation or comparison from taking place.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
10	16	Data Unknown	Operand type does not conform to any available form.	Yes	Yes	Yes	Major	<b>Major</b>	Valid types include byte, unsigned long, Boolean, float, etc.
11	17	<i>Not used</i>							
12	18	Data Mismatch	Operand types are not equivalent. This prohibits a valid computation or comparison from taking place.	Yes	Yes	Yes	Major	<b>Major</b>	Check application program for improper data type comparisons. Valid types include byte, unsigned long, Boolean, float, etc.
13	19	Bad Data Type	Operand type cannot be used for this specific computation or comparison.	Yes	Yes	Yes	Major	<b>Major</b>	Check application program for improper comparisons. Example of this is attempting to compare a Boolean with a string pointer.
14	20	Bad Address	An attempt has been made to access data from an invalid memory location.	Yes	Yes	Yes	Major	<b>Major</b>	Check memory allocation for this node in Smart Trac AC1 Workstation software. In Configure dialog box, make sure the following is true: Base Address = 0x300000, Base Memory Size = 0x100000, Retentive Address = 0xDC000, and Retentive Size = 0x3F00. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 12 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
15	21	Operand2 Invalid	2 <sup>nd</sup> operand code within program is unrecognized. Valid Opcodes are add, subtract, AND, OR, etc.	Yes	Yes	Yes	Major	Major	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. Replace the SmartTrac CPU card.
16	22	Operand1 Invalid	1 <sup>st</sup> operand code within program is unrecognized. Valid Opcodes are add, subtract, AND, OR, etc.	Yes	Yes	Yes	Major	Major	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
17	23	Invalid Jump	Calculated offset appears outside the bounds of the program. Branch cannot be completed.	Yes	Yes	Yes	Major	Major	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
18	24	Invalid Address	Address does not appear within NVRAM, DRAM, nor Task table.	Yes	Yes	Yes	Major	Major	Check memory allocation for this node in Smart Trac Workstation software. In Configure dialog box, make sure the following is true: Base Address = 0x300000, Base Memory Size = 0x100000, Retentive Address = 0xDC000, and Retentive Size = 0x3F00. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
*Product Development*  
*Design Document*

Faults.doc

Rev. # 19 Page 13 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
19	25	Float Error	Floating point error: an unknown float error, which is detected only if all other floating point errors have not triggered a fault (underflow, overflow, float invalid).	No	Yes	Yes	Minor	Minor	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
1A	26	Fstack Overflow	Float stack overflow. Float pointer has gone past the end of the float stack.	Yes	Yes	Yes	Minor	Major	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
1B	27	Fstack Underflow	Float stack underflow. Float pointer has preceded the beginning of the float stack.	Yes	Yes	Yes	Minor	Major	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
1C	28	Bad Operand	Based on the operand's mode, operand address is invalid.	Yes	Yes	Yes	Major	Major	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 14 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
1D	29	Operand Negative	Situation where a value should not be negative. The SQRT, LOG and LN functions will declare this fault if their input is negative.	No	Yes	Yes	Minor	<b>Minor</b>	Search your application program to ensure that only positive values can be input to the SQRT, LOG and/or LN functions.
1E	30	Out of Memory	Attempt to allocate memory for the program stack and initialize it to zero has failed.	Yes	Yes	Yes	Major	<b>Major</b>	The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
1F	31	Action Invalid	Based on what is encountered in the program, certain routines or 'actions' are processed. If the requested action does not match those that are available, this fault will be realized.	Yes	Yes	Yes	Major	<b>Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
20	32	I/O Read Fail	Could not read input image table for an associated driver, i.e., Interface Card.	Yes	Yes	Yes	Major	<b>Major</b>	An Interface Card (driver) may be out of date. Check for valid installed hardware. For example, if using the STLAN driver, make sure an ARCNET card is part of the Smart Trac drive card stack.
21	33	I/O Write Fail	Could not write to output image table for an associated driver, i.e., Interface Card.	Yes	Yes	Yes	Major	<b>Major</b>	An Interface Card (driver) may be out of date. Check for valid installed hardware. For example, if using the STLAN driver, make sure an ARCNET card is part of the Smart Trac drive card stack. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

## Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
22	34	Bad C Call	A functional call within the program failed. Specifically, the amount of information being placed on stack(s) will exceed limit.	Yes	Yes	Yes	Major	<b>Major</b>	Application program may be overburdened – reduce amount of logic placed in fast Tasks (15ms or faster) to slow Tasks (30ms or slower). This may include reducing number of Program Units and/or program elements.
23	35	String Overrun	Length of text to be displayed exceeds maximum number of allowable characters.	No	Yes	Yes	Minor	<b>Minor</b>	Avoid use of extremely long text. Function Block names and symbol names should be kept to a manageable length (< 64 chars).
24	36	Negative Shift	During conversion of a data type (number), the argument used to specify how many places to shift was negative.	No	Yes	Yes	Minor	<b>Minor</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
25	37	Bad Coercion	Invalid data type promotion, i.e., change a 'double' to a 'byte'.	Yes	Yes	Yes	Major	<b>Major</b>	Check application program for data type mismatches.
26	38	Bad Address Mode	Problem found when validating operand types. Incorrect mode used when processing operand and data type.	No	Yes	Yes	Minor	<b>Minor</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

10/17/00



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**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 16 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
27	39	Bad Bit Number	Requested bit number is unavailable.	No	Yes	Yes	Minor	Minor	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
28	40	Bad Data Size	Mismatch found when performing computation on 2 differing data types.	No	Yes	Yes	Minor	Minor	Check application program for data type mismatches.
29	41	Bit Out of Range	Logical bit does not fit within bounds of data type. For example, an attempted was made to OR bit 0x0800 with a byte.	No	Yes	Yes	Minor	Minor	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
2A	42	Bad Function Ptr	Pointer to a Function Block call is invalid. 'C' FB cannot be processed.	No	Yes	Yes	Minor	Minor	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
2B	43	Bad Lower Bound	Index into an internal array has exceeded the lower bounds.	No	Yes	Yes	Minor	Minor	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 17 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
2C	44	Bad Upper Bound	Index into an internal array has exceeded the upper bounds.	No	Yes	Yes	Minor	Minor	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists..
2D	45	Invalid DateTime	Invalid date or time has been specified.	No	Yes	Yes	Minor	Minor	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists..
2E	46	Invalid P-code	Invalid P-code instruction	Yes	Yes	Yes	Critical	Critical and Major	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists..
2F	47	<i>Not used</i>							
...	...	...							
...	...	...							
7FF7	32759	<i>Not used</i>							
7FF8	32760	User Task Hung	Attempts to terminate a Task, or remove it completely from the processing queue have failed.	Yes	Yes	Yes	Critical	Critical and Major	Application program may be overburdened – reduce amount of logic placed in fast Tasks (15ms or faster) to slow Tasks (30ms or slower). This may include reducing number of Program Units and/or program elements.

10/17/00



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Technology Center

*Smart Trac*  
*Product Development*  
*Design Document*

Faults.doc

Rev. # 19 Page 18 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
7FF9	32761	No Startup FB	No startup function block was configured for a user task.	Yes	Yes	Yes	Critical	<b>Critical and Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists..
7FFA	32762	Breakpoint Set	Breakpoint encountered in program. Not really a fault but used for debug purposes.	Yes	Yes	Yes	N/A	<b>Critical and Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
7FFB	32763	Bad Offset Range	Attempt to address data within memory is out of range.	Yes	Yes	Yes	Critical	<b>Critical and Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
7FFC	32764	Task Overrun	Task has taken too long to complete. Applies to Cyclic and IoSync Tasks only.	Yes	Yes	Yes	Critical	<b>Critical and Major</b>	Application program may be overburdened – reduce amount of logic placed in fast Tasks (15ms or faster) to slow Tasks (30ms or slower). This may include reducing number of Program Units and/or program elements.
7FFD	32765	Restart Failed	A request to have a Task change from stop to start mode has failed.	Yes	Yes	Yes	Critical	<b>Critical and Major</b>	Check for valid installed hardware. For example, if using the STLAN driver, make sure an ARCNET card is part of the Smart Trac card stack.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
*Product Development*  
*Design Document*

Faults.doc

Rev. # 19 Page 19 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager								
7FFE	32766	Watchdog Timeout	One or more Program Units associated with a Task have not been completed within the 'Watch Dog Timeout' setting.	Yes	Yes	Yes	Critical	<b>Critical and Major</b>	Extend the Watchdog Timeout for the faulted Task. Generally, do not exceed 3x the cyclic task's value nor 300ms for an IoSync Task. Application program may be overburdened – reduce amount of logic placed in fast Tasks (15ms or faster) to slow Tasks (30ms or slower). This may include reducing number of Program Units and/or program elements.
7FFF	32767	Fatal Error	Unrecoverable fault, usually occurs during Driver startup.	Yes	Yes	Yes	Critical	<b>Critical and Major</b>	Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

Title: Fault Declarations

### 3. User Defined Faults

These are faults assigned by the Application Engineer using the S\_FLT function block.

User defined faults are just that – they’re faults defined by the person who does the Smart Trac AC1 Workstation programming. Faults are defined in the Fault Manager Interface Card. Fault Legend Text is entered via *Fault Editor* tab. Fault codes or numbers are automatically assigned for each entry or the Application Engineer can select any decimal fault code number in the 65,536 to 75,535 range. After text for a user defined fault has been assigned, it needs to be associated with an output. This is done in *Define Outputs* tab. Select the desired fault output, or create a new fault output, and then assign any user defined fault to it. It is also in this location where the engineer may choose “Critical”, “Major”, or “Minor” as the assigned program input. Once a corresponding fault symbol has been added, the Application Engineer is free to use the symbol in his/her program. An S\_FLT block can be used to announce a user defined fault and C\_FLT can be used to clear the fault. (It may be desirable to reset the fault via Control Node Monitor, by setting the Fault Manager’s *FaultReset1* symbol, or by pressing RESET on the Digital Operator.) The decimal fault code must be connected to the FCD input (shown on function block). See S\_FLT help in Smart Trac AC1 Workstation software for directions.

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
10000	65536	0	User Fault #1	User definition #1	TBD	TBD	TBD	Major or Minor	<b>Critical, Major, Minor, or user defined</b>	User corrective action #1.
10001	65537	1	User Fault #2	User definition #2	TBD	TBD	TBD	Major or Minor	<b>Critical, Major, Minor, or user defined</b>	User corrective action #2.
...	...	...	...	...				...	...	
...	...	...	...	...				...	...	
...	...	...	...	...				...	...	
...	...	...	...	...				...	...	
1270F	75535	9999	User Fault #9999	User definition #9999	TBD	TBD	TBD	Major or Minor	<b>Critical, Major, Minor, or user defined</b>	User corrective action #9999.

Title: Fault Declarations

#### 4. Function Blocks

The following section details fault numbers assigned to C language function blocks.

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12AF8	76536	11000	No System Clock	A 'C' language function block (WEBB or DIAM_0) has made a system call to get the present time and the call returned indicating that the time was not available. This fault is declared by blocks that need to know the present relative time to perform their function.	No	Yes	Yes	Minor	Minor	Some incompatibility may be happening with the version of the operating system and the downloaded program. The CPU card may be defective.
12AF9	76537	11001	Web Break	The WEBB block has declared a web break.	Yes	Yes	Yes	Minor	Major	Check web material for breakage or look at logic output for same, and repair if necessary.
12AFA	76538	11002	Illegal Scan Time	Either the RAMP, RAMP_1, SCRIV or SPDR_1 block has an illegal scan time.	Yes	Yes	Yes	Minor	Major	The RAMP and RAMP_1 block cannot operate with a scan time of less than 0.002 seconds; the SCRIV block cannot operate with a scan time of less than 0.0005 seconds. The SPDR_1 block must have a scan time > 0.

## Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12AFB	76539	11003	Illegal Input	The input to a block has an inappropriate input. The blocks declaring this are CAVE, DAVE, LDelay, NDelay, REFQ, TENR_1, POSR_1, and POSR_2. These function blocks expect parameter inputs within a specified number range.  ( Note: this fault applies to MAG_CPB libraries V1.8 and older. )	Yes	Yes	Yes	Minor	<b>FB_setup</b>	Refer to block description Help in Smart Trac AC1 Workstation software. Obey these limits: Samples for <b>CAVE</b> = 1 to 500; Samples for <b>DAVE</b> = 1 to 1000; Delays for <b>LDelay</b> = 1 to 500; Delays for <b>NDelay</b> = 1 to 500; <b>REFQ</b> CascadeNumber = 1 to MaxCascadeNumber; <b>TENR_1</b> needs inputs for Webwidth, WebThickness and TensionZoneLength. <b>POSR_1</b> Roll_Diameter ≥ 1; For <b>POSR_2</b> , all of these must be > 0: RatedLineSpd, R1_Factor, R2_Factor, RatedDancerStorage, S_RPM_At_M_RPM, POSR_0_ScanTime.
12AFC	76540	11004	PG Illegal Port	The port setting to the PG_ANALOG_IN, PG_DELTA_P, or PG_TACH block is not one of the legal values of 0, 1, 2 or 3.	Yes	Yes	Yes	Minor	<b>Major</b>	Port number is used to identify the PG card. Note: older versions of the PG card had legal values of 0 through 3. Newer PG cards have only one port setting. Use PortNumber = 1.
12AFD	76541	11005	PG Illegal Chan	The channel input setting to the PG_TACH or PG_ANALOG_IN block is not one of the legal values of 0 or 1.	Yes	Yes	Yes	Minor	<b>Major</b>	Use only channel 0 or channel 1. All other values will cause this fault. Reference drive schematic to set correctly.

10/17/00



New Berlin  
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**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 23 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12AFE	76542	11006	PG Card ID Error	The PG card can't be found. This is due to the software not seeing the correct identification code on the PG card.	Yes	Yes	Yes	Minor	<b>Major</b>	The correct PG card must be installed for the Smart Trac AC1 function blocks used.
12AFF	76543	11007	PG A/D Retries	The PG_ANALOG_IN function block senses that the PG card has not done an analog to digital conversion in the allotted time after the number of attempts set by the TriesB4Fault input to the PG_ANALOG_IN block.	No	Yes	Yes	Minor	<b>Minor</b>	Try increasing the number of attempts for conversion, TriesB4Fault, to a higher value. Possibility the PG card is defective.
12B00	76544	11008	I/O Memory Alloc	Dynamic RAM was not available for use by one or more Function Blocks.	Yes	Yes	Yes	Minor	<b>Major</b>	These Function Blocks require use of DRAM: CAVE, LDelay, NDelay, and REFQ. One of these FBs was unable to allocate memory to support its function. Recycle power to Smart Trac AC1. If problem persists, replace Smart Trac CPU card.

## Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12B01	76545	11009	TAPER Setup Flt	The TAPER block declares this fault if input Tension Setpoint < 0, or input Taper Ratio <=0, or input Present Diameter <=0, or input Core Diameter <= 0, or input Full Roll Diameter <= input Core Diameter, or input RatioAt20Percent_BU <=0, or input RatioAt40Percent_BU <=0, or input RatioAt60Percent_BU <=0, or input RatioAt80Percent_BU <=0, or input RatioAt100Percent_BU <= 0.	No	Yes	Yes	Minor	<b>FB_setup</b>	Change application program to meet the following: Tension Setpoint ≥ 0, Taper Ratio > 0, Present Diameter > 0, Core Diameter > 0, Full Roll Diameter > Core Diam, RatioAt20Percent_BU > 0, RatioAt40Percent_BU > 0, RatioAt60Percent_BU > 0, RatioAt80Percent_BU > 0, RatioAt100Percent_BU > 0.
12B02	76546	11010	PG_DELTA_P ID	The PG Delta card can't be found. This is due to the software not seeing the correct identification code on the PG card which is used for registration applications.	Yes	Yes	Yes	Minor	<b>Major</b>	The correct PG card must be installed for the Smart Trac PG_DELTA_P function block used.
12B03	76547	11011	PG_DELTA_P Setup	The PG_DELTA_P function block declares this fault when the counter start and stop source inputs are not in the range from 1 to 4.	No	Yes	Yes	Minor	<b>Minor</b>	Change input value(s) to counter start input and stop source such that they fall within the range of 1 through 4.
12B04	76548	11012	FGEN5 Input	The FGEN5 block declares this fault if input X_At_X5 is set to a value less than or equal to input X_At_X0.	No	Yes	Yes	Minor	<b>FB_setup</b>	Set inputs such that X_At_X5 > X_At_X0.
12B05	76549	11013	LDelay Input	An LDelay function block has detected that its "Delays" input is outside the valid range of 1 to 500.	No	Yes	Yes	Minor	<b>FB_setup</b>	Review the LDelay function blocks to ensure all "Delays" inputs are within the range of 1 to 500.

## Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12B06	76550	11014	NDelay Input	An NDelay function block has detected that its "Delays" input is outside the valid range of 1 to 500.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Review the NDelay function blocks to ensure all "Delays" inputs are within the range of 1 to 500.
12B07	76551	11015	REFQ Input	A REFQ function block has detected a "CascadeNumber" input > "MaxCascadeNumber" input, or, "MaxCascadeNumber" input does not fall within a valid range of 1 through 255.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure the REFQ function block has a "CascadeNumber" input less than or equal to "MaxCascadeNumber" input. Ensure "MaxCascadeNumber" input ranges from 1 to 255.
12B08	76552	11016	DIAM_2 Input	A DIAM_2 block has detected an out of range value on one or more of its inputs labeled RatedLineSpeed, S_RPM_AT_M_RPM, MaxDiameter, MinDiameter, or NumberCalculation.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure the DIAM_2 block has the proper values at its inputs as follows: RatedLineSpeed > 0, S_RPM_AT_M_RPM > 0, MinDiameter > 2 inches, or 5 cm, MinDiameter <= MaxDiameter <= 99 inches, or 200 cm, 0 <= NumberCalculation <= 255.
12B09	76553	11017	INRT_1 Input	An INRT_1 block has detected a value of 0 on the RatedHorsepower input.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure the INRT_1 block has a positive, non-zero value for its RatedHorsepower input.
12B0A	76554	11018	CTCW_0 Input	A CTCW_0 block has detected a value of 0 on its Diameter input	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure the CTCW_0 block has a positive, non-zero value for its Diameter input.
12B0B	76555	11019	CTCW_1 Input	A CTCW_1 block has detected a value of 0 on either the Horsepower or the S_RPM_AT_M_RPM inputs.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure that the CTCW_1 block has positive, non-zero values for both the Horsepower and S_RPM_AT_M_RPM inputs.

10/17/00



New Berlin  
Technology Center

*Smart Trac*  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 26 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12B0C	76556	11020	PG_TACH Input	A PG_TACH or PG_TACH2 block has detected a value of 0 on the TachCounts or RatedSpeed inputs.	No	Yes	Yes	Minor	<b>FB_setup</b>	Ensure the PG_TACH or PG_TACH2 block has non-zero values for the TachCounts and RatedSpeed inputs.
12B0D to 12B5B	76557 to 76635	11021 to 11099	<i>Not Used</i>							
12B5C	76636	11100	Tach Loss	The TMON block has detected a tachometer (encoder) loss.	Yes	Yes	Yes	Minor	<b>Major</b>	Check wiring from encoder to PG card. Tach loss occurs when AuxSpeedSense $\geq$ (AuxSenseLevel / 100) and TachometerInput < (TachSenseLevel / 100).
12B5D	76637	11101	Reverse Tach Flt	The TMON block has detected a reversed tachometer (encoder) connection.	Yes	Yes	Yes	Minor	<b>Major</b>	Change wiring from encoder to PG card. Declared when AuxSpeedSense $\geq$ (AuxSenseLevel / 100) AND (ReferenceInput > 0 and TachometerInput < 0) OR (ReferenceInput < 0 and TachometerInput > 0).
12B5E	76638	11102	Fwd Overspeed	The TMON block has detected an overspeed condition in the forward direction.	Yes	Yes	Yes	Minor	<b>Major</b>	Motor speed has exceeded the forward setpoint: TachometerInput > (FwdOverspeedLimit / 100). Reduce commanded speed or load if runaway condition exists.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 27 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12B5F	76639	11103	Rev Overspeed	The TMON block has detected an overspeed condition in the reverse direction.	Yes	Yes	Yes	Minor	<b>Major</b>	Motor speed has exceeded the reverse setpoint: TachometerInput < (RevOverspeedLimit / 100). Reduce commanded speed or load if runaway condition exists.
12B60	76640	11104	TENR Input	A TENR function block has detected a value of zero for any one of these inputs: TensionZoneLength, WebWidth, WebThickness, or YoungsModulus.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure that the TENR function block has non-zero values at TensionZoneLength, WebWidth, WebThickness or YoungsModulus inputs. Note that a function block uses a value of '0' when an input is left unconnected.
12B61	76641	11105	SCRV Input	A SCRv function block has detected a negative value for one of these inputs: Accel_Time, Decel_Time, Accel_Jrk_Percent, Decel_Jrk_Percent.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure that the SCRv block has Accel_Time, Decel_Time, Accel_Jrk_Percent, and Decel_Jrk_Percent input values are greater than or equal to zero.
12B62	76642	11106	DAVE Input	A DAVE function block has detected an out of range value at its "NumberOfSamples" input.	No	Yes	Yes	Minor	<b>FB_se tup</b>	Ensure that the DAVE function blocks use values from 1 to 500 at their "NumberOfSamples" inputs.

## Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12B63	76643	11107	CAVE Input	A CAVE function block has detected an out of range value at its "NumberOfSamples" or "MaxNumberOfSamples" input, or an infinite or NaN value at its "InputSignal" input.	No	Yes	Yes	Minor	<b>FB_setup</b>	Ensure that the CAVE function block uses a range of 1 to 500 for "MaxNumberOfSamples" input and "NumberOfSamples" $\leq$ "MaxNumberOfSamples". Ensure that the value at "InputSignal" is not infinity or NaN (Not A Number). Infinity can be created by dividing by zero or taking the logarithm of 0. NaN values can be created with equations such as square root of a negative number or zero divided by zero.
12B64	76644	11108	POSR_1 Input	A POSR_1 function block has detected an out of range value at its "Roll_Diameter" input or its RetainMaxValue input is equal to its RetainMinValue input.	No	Yes	Yes	Minor	<b>FB_setup</b>	Ensure that the POSR_1 function block uses a value for its "Roll_Diameter" input $\geq$ 1. Ensure that the Dancer Signal has been calibrated (i.e. its RetainMinValue and RetainMaxValue must both not equal zero).
12B65	76645	11109	POSR_2 Input	A POSR_2 function block has detected an out of range value for one of its inputs labeled "RatedLineSpd", "S_RPM_At_M_RPM", "RatedDancerStorage", "R1_Factor", or "R2_Factor".	No	Yes	Yes	Minor	<b>FB_setup</b>	Ensure that the POSR_2 function block inputs labeled "RatedLineSpd", "S_RPM_At_M_RPM", "RatedDancerStorage", "R1_Factor", and "R2_Factor" have values $>$ 0.

10/17/00



New Berlin  
Technology Center

*Smart Trac*  
*Product Development*  
*Design Document*

Faults.doc

Rev. # 19 Page 29 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
12B66	76646	11110	GEAR Input	A GEAR function block has detected a value of '0' for its "InputGear_Denominator" input.	No	Yes	Yes	Minor	<b>FB_setup</b>	Ensure that the GEAR function block input(s) "InputGear_Denominator" is not set to zero.
12B67	76647	11111	POSR_0 Input	A POSR_0 function block has calculated an out of range value for its "DancerOut" output. "DancerOut" is the "DancerSignal" modified by a SPAN and ZERO adjustments provided by corresponding the POSR_1 function block. "DancerOut" is a per-unit number and this fault is declared if "DancerOut" calculates as less than -0.1 or greater than +1.1.	No	Yes	Yes	Minor	<b>FB_setup</b>	Ensure that the DancerSignal of the corresponding POSR_1 function block has been calibrated. Ensure that the dancer feedback mechanism has not moved. The dancer signal in the corresponding POSR_1 function block may need recalibration.

Title: Fault Declarations

## 5. Drivers

### 5.1 DPRAM Driver

The following section details fault numbers assigned to Dual Port RAM.

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14E20	85536	20000	DPRAM HS Resp	High Speed response handshake fault between the Smart Trac AC1 CPU card and the inverter control card.	No	Yes	Yes	Minor	Minor	High Speed data such as torque reference and motor speed cannot be obtained from the inverter card. Recycle drive power. If problem persists, consult the factory.
14E21	85537	20001	DPRAM HS Cmd	High Speed command handshake fault between the Smart Trac AC1 CPU card and the inverter control card.	Yes	Yes	Yes	Minor	Major	High Speed command information such as Run/Stop cannot be sent to the inverter card. Drive must be stopped by externally-wired E-stop. Recycle drive power. If problem persists, consult the factory.
14E22	85538	20002	DPRAM Response	DPRAM response handshake fault between the Smart Trac AC1 CPU card and the inverter control card.	No	Yes	Yes	Minor	Minor	Inverter parameters such as 'Accel Time 1' cannot be obtained from the inverter card. Recycle drive power. If problem persists, consult the factory.
14E23	85539	20003	DPRAM Command	DPRAM command handshake fault between the Smart Trac AC1 CPU card and the inverter control card.	No	Yes	Yes	Minor	Minor	Cannot send parameters values from Smart Trac drive's CPU card to inverter card. Recycle drive power. If problem persists, consult the factory. Note: there are some critical parameters that cannot be changed during Run.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 31 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14E24	85540	20004	DPRAM Address	DPRAM bad address or register requested fault between the Smart Trac AC1 CPU card and the inverter control card.	Yes	Yes	Yes	Minor	<b>Major</b>	Check for correct inverter model number; don't forget to initialize the inverter card if model number was changed. Make sure the inverter Control Method is set to 'Flux Vector' (typical).
14E25	85541	20005	DPRAM Param Num	Bad number of parameters requested from Dual Port RAM of the Smart Trac AC1 CPU card (to inverter control card).	Yes	Yes	Yes	Minor	<b>Major</b>	The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.
14E26	85542	20006	DPRAM Parm Range	Bad parameter data specified between the Smart Trac AC1 CPU card and the inverter control card. Parameter setting sent to inverter is out of range for that inverter.	No	Yes	Yes	Minor	<b>Minor</b>	Check for correct inverter model number; don't forget to initialize the inverter card if model number was changed. Look for obvious mistakes in the application program such as attempting to alter inverter current settings. Make sure the inverter Control Method is set to 'Flux Vector' (typical).
14E27	85543	20007	DPRAM Chg @ Run	Dual Port RAM non-run inverter parameter change requested between the Smart Trac AC1 CPU card and the inverter control card while the inverter is running.	No	Yes	Yes	Minor	<b>Minor</b>	Certain parameters cannot be changed while the inverter is running a motor. Application program should be structured to avoid writes to these parameters during Run conditions.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 32 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14E28	85544	20008	DPRAM Write@UV	Dual Port RAM write requested between the Smart Trac AC1 CPU card and the inverter control card while there is an undervoltage fault	No	Yes	Yes	Minor	<b>Minor</b>	Correct undervoltage issue – check quality of AC power supply.
14E29	85545	20009	DPRAM Write@Calc	Dual Port RAM write requested between the Smart Trac AC1 CPU card and the inverter control card, while a parameter is being calculated.	No	Yes	Yes	Minor	<b>Minor</b>	The inverter card continually performs background calculations on internal parameters. If this fault persists, consult the factory.
14E2A	85546	20010	DPRAM Unknwn Rsp	Unknown Dual Port RAM response between the Smart Trac AC1 CPU card and the inverter control card.	Yes	Yes	Yes	Minor	<b>Major</b>	Smart Trac AC1 CPU card received information from inverter card that is incorrect. Inverter firmware may be wrong version or inverter card may be defective.
14E2B	85547	20011	DPRAM Tref Hndsk	Dual Port RAM 2ms Torque Reference handshake fault between the Smart Trac AC1 CPU card and the inverter control card.	Yes	Yes	Yes	Minor	<b>Major and Minor</b>	Check integrity of physical connection between Smart Trac AC1 CPU card and inverter card. Check Inverter Type in Boot menu: for most cases, value should be set for 2 ms Torq Update. Application program may be overburdened – reduce amount of logic placed in fast Tasks (15ms or faster) to slow Tasks (30ms or slower).

Title: Fault Declarations

**5.2 STLAN Driver**

The following section details fault numbers assigned to Smart Trac AC1 Local Area Network (ARCNET).

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14EE8	85736	20200	LAN Hardware Flt	LAN hardware fault.	Yes	Yes	Yes	Minor	<b>Major</b>	ARCNET card is defective or not installed properly.
14EE9	85737	20201	LAN Max Tx Flt	LAN - max number of transmit attempts exceeded.	No	Yes	Yes	Minor	<b>Minor</b>	Attempting to transmit LAN messages to a channel or node that isn't active or doesn't exist.
14EEA	85738	20202	LAN Illegal Msg	LAN - illegal message type.	No	Yes	Yes	Minor	<b>Minor</b>	Message is not supported by STLAN Interface Card.
14EEB	85739	20203	LAN Missed Bcast	LAN missed a broadcast message.	No	Yes	Yes	Minor	<b>Minor</b>	Excessive amount of LAN traffic. Reduce number of messages being sent/received. May have too many nodes on the network – use an ARCNET active hub to buffer messages.
14EEC	85740	20204	LAN Missed Direct	LAN missed a directed message.	No	Yes	Yes	Minor	<b>Minor</b>	Excessive amount of LAN traffic. Reduce number of messages being sent/received. May have too many nodes on the network – use an ARCNET active hub to buffer messages.
14EED	85741	20205	LAN No Tx Room	LAN - no room to transmit message.	No	Yes	Yes	Minor	<b>Minor</b>	Excessive amount of LAN traffic. Reduce number of messages being sent/received.
14EEE	85742	20206	LAN No Rx Room	LAN - no room to receive message.	No	Yes	Yes	Minor	<b>Minor</b>	Excessive amount of LAN traffic. Reduce number of messages being sent/received.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 34 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14EEF	85743	20207	LAN Rem Out Time	Remote No Output Command Fault – This message is sent from a remote I/O node when it does not receive an output command LAN message from a Smart Trac AC1 drive, that has allocated one or more outputs, within the prescribed time.	No	Yes	Yes	Minor	Minor	Possibility that a supporting Task in Smart Trac AC1 has encountered a fault.
14EF0	85744	20208	LAN Rem Num In	Numeric Input Request Fault – This message is sent from the remote I/O node to the Smart Trac AC1 drive when the remote I/O node cannot provide a digital numeric input to the drive for reasons other than LAN failure.	No	Yes	Yes	Minor	Minor	A typical reason for this condition might be that there is no digital numeric input module located at the given channel/subchannel.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 35 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14EF1	85745	20209	LAN Rem Logic In	Logic Input Request Fault – This message is sent from the remote I/O node to the Smart Trac AC1 drive when the remote I/O node cannot provide a logical input for reasons other than LAN failure.	No	Yes	Yes	Minor	<b>Minor</b>	A typical reason for this condition might be there is no logic I/O channel located at the given channel.
14EF2	85746	20210	LAN Rem Num Out	Numeric Output Allocation Fault – The requested numeric output allocation could not take place because of an allocation conflict with another device or the absence of the device(s) being requested.	No	Yes	Yes	Minor	<b>Minor</b>	Check for duplicate LAN node, channel and subchannel in drive programs. Possible incorrect setting of node channel or subchannel at remote device.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 36 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14EF3	85747	20211	LAN Rem LogicOut	Logic Output Allocation Fault -The requested logic output allocation could not take place because of an allocation conflict with another device or the absence of the device(s) being requested.	No	Yes	Yes	Minor	<b>Minor</b>	Check for duplicate LAN node, channel and subchannel in drive programs. Check that the node, channel, and subchannel exists for remote I/O devices.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
*Product Development*  
*Design Document*

Faults.doc  
Rev. # 19 Page 37 of 64

Title: Fault Declarations

### 5.3 Operator Driver

The following section details fault numbers assigned to JVOP-130 Digital Operator.

Notes:

- As of this print date, no Operator faults exist.
- TBD = To Be Determined.

Displayed Fault No.		Internal Fault #	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
14FB0	85936	20400	DigOp	TBD				Minor	TBD	TBD
14FB1	85937	20401	DigOp	TBD				Minor	TBD	TBD
14FB2	85938	20402	DigOp	TBD				Minor	TBD	TBD
14FB3	85939	20403	DigOp	TBD				Minor	TBD	TBD
14FB4	85940	20404	DigOp	TBD				Minor	TBD	TBD
14FB5	85941	20405	DigOp	TBD				Minor	TBD	TBD
14FB6	85942	20406	DigOp	TBD				Minor	TBD	TBD

Title: Fault Declarations

## 6. Inverter

The following section details fault numbers assigned to the Smart Trac AC1 Inverter (Power Conversion Unit).

Notes:

- Inverter faults will be declared only if properly setup in Fault Manager, DPRAM Interface Card, and the application program.
- These faults are declared when the inverter sees them as major faults. As Minor faults, these fault codes are not generated but drive may still set a minor fault bit.
- All Inverter faults listed here correspond to those found in MagneTek's GPD515 Technical Manual.

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17530	95536	30000	DC Bus Fuse Open	PUF – Fuse blown. DC fuse has cleared.	Yes	Yes	Yes	Minor	<b>Major</b>	Check for short circuit in output circuitry. Possibility of motor windings T1, T2 and/or T3 shorted. Possibility of drive output phases shorted to ground. Possibility power transistors are damaged.
17531	95537	30001	DC Bus Undervolt	UV1 – Main circuit undervoltage. Occurs 2 seconds after detection of low voltage. Detection levels: 190VDC for 230V rated unit; 380VDC for 460V rated unit; 546VDC for 600V rated unit.	Yes	Yes	Yes	Minor	<b>Major</b>	Check input AC supply. Possibility of erroneous operation due to noise: remove noise source by connecting surge suppressor to relay and magnetic contactor coils; provide line filter to remove noise on input power line. Possibility of gate drive PCB is faulty. Note: fault is declared only if drive is in Run mode.
17532	95538	30002	CTL PS Undervolt	UV2 – Control circuit undervoltage. Control circuit voltage is low during operation.	Yes	Yes	Yes	Minor	<b>Major</b>	Possibility of poor DC supply being furnished by drive. Note: fault is declared only if drive is in Run mode.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 39 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17533	95539	30003	MC Answerback	UV3 – Main contactor fault. Main circuit magnetic contactor (soft charge contactor) does not operate correctly.	Yes	Yes	Yes	Minor	<b>Major</b>	Check contactor wiring. Inspect contactor for damage and defects. Note: fault is declared only if drive is in Run mode.
17534	95540	30004	Short Circuit	SC – Short circuit on Smart Trac AC1 inverter PCB output terminals (motor wiring).	Yes	Yes	Yes	Minor	<b>Major</b>	Check for correct motor wiring/capacity. Note: fault is declared only if drive is in Run mode.
17535	95541	30005	Ground Fault	GF – Ground fault. Drive output ground current exceeded 50% of drive rated current.	Yes	Yes	Yes	Minor	<b>Major</b>	Check for correct motor wiring/capacity. Look for shorts between motor leads and ground. Inverter power transistor(s) may be damaged. Note: fault is declared only if drive is in Run mode.
17536	95542	30006	Overcurrent	OC – Overcurrent. Output current exceeded 200% of drive rated current.	Yes	Yes	Yes	Minor	<b>Major</b>	Acceleration time may be set too low. Motor load may be too great for drive to handle. Motor may be jammed or defective. Note: fault is declared only if drive is in Run mode.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 40 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17537	95543	30007	DC Bus Overvolt	OV – Overvoltage. Detection levels: 400VDC for 230V rated unit; 800VDC for 460V rated unit; 1050VDC for 600V rated unit.	Yes	Yes	Yes	Minor	<b>Major</b>	Check input AC supply. Possibility of erroneous operation due to noise: remove noise source by connecting surge suppressor to relay and magnetic contactor coils; provide line filter to remove noise on input power line. If OV trip occurs during deceleration, increase deceleration time; may need dynamic braking option. Note: fault is declared only if drive is in Run mode.
17538	95544	30008	Heatsnk Overtemp	OH – Cooling fin overheat. Heatsink fin temperature exceeded preset value found in inverter parameter L8-02.	Yes	Yes	Yes	Minor	<b>Minor</b>	Major fault declared only if inverter parameter L8-03 ≠ 3. Reduce ambient temperature to less than 45°C (113° F). Clean heat sink. Replace cooling fan if necessary.
17539	95545	30009	Heatsnk MAX Temp	OH1 – Drive overheat. Heatsink fin temperature exceeded 105° C (221° F).	Yes	Yes	Yes	Minor	<b>Major</b>	Reduce ambient temperature to less than 45°C (113° F). Clean heat sink. Replace cooling fan if necessary.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 41 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
1753A	95546	30010	Motor Overloaded	OL1 – Motor overload. Protects the motor. Motor thermal overload protection has tripped. Inverter parameter L1-02 has been exceeded (initial value: 150% for 60 sec.).	Yes	Yes	Yes	Minor	<b>Major</b>	Major fault is declared if L1-01 = 1. Load may be too large. Check drive capacity (inverter parameter o2-04) for correct factory setting. Check for proper setting of electronic thermal overload setting: inverter parameters E1-02, E2-01, L1-02. Try disconnecting motor wiring from output terminals – if OL is still indicated, problem may be due to noise or faulty inverter cards
1753B	95547	30011	Inv Overloaded	OL2 – Drive overload. Protects the Smart Trac AC1 drive. Drive overload protection has tripped.	Yes	Yes	Yes	Minor	<b>Major</b>	See fault “Motor Overloaded” for details.
1753C	95548	30012	Overtorque Det 1	OL3 – Overtorque detect 1. Output current exceeded Overtorque Detection Level 1 set in inverter parameter L6-02.	Yes	Yes	Yes	Minor	<b>Major</b>	Declared only if inverter parameter L6-01= 3 or 4. Reduce load, increase acceleration time, or increase inverter parameter setting L6-02.
1753D	95549	30013	Overtorque Det 2	OL4 – Overtorque detect 2. Output current exceeded Overtorque Detection Level 2 set in inverter parameter L6-05.	Yes	Yes	Yes	Minor	<b>Major</b>	Declared only if inverter parameter L6-04= 3 or 4. Reduce load, increase acceleration time, or increase inverter parameter setting L6-05.
1753E	95550	30014	DynBrk Transistr	RR – Dynamic braking transistor failure.	Yes	Yes	Yes	Minor	<b>Major</b>	Replace dynamic braking unit.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 42 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
1753F	95551	30015	DynBrk Resistor	RH – Dynamic braking resistor overheat. Braking resistor unit temperature exceeded allowable value. (Heatsink-mount resistor only, and only if inverter parameter L8-01 = 1).	Yes	Yes	Yes	Minor	<b>Major</b>	Allow dynamic braking resistors to cool before continuing operation. If problem persists, decrease load sizes or reevaluate dynamic braking requirements.
17540	95552	30016	External Fault 3	EF3 – External fault signal at terminal 3 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Major</b>	A fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. The input labeled ‘Major’ will be true only if inverter parameter H1-01 = 20 to 2B hex.
17541	95553	30017	External Fault 4	EF4 – External fault signal at terminal 4 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Major</b>	A fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. The input labeled ‘Major’ will be true only if inverter parameter H1-02 = 20 to 2B hex.
17542	95554	30018	External Fault 5	EF5 – External fault signal at terminal 5 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Major</b>	A fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. The input labeled ‘Major’ will be true only if inverter parameter H1-03 = 20 to 2B hex.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 43 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17543	95555	30019	External Fault 6	EF6 – External fault signal at terminal 6 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Major</b>	A fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. The input labeled ‘Major’ will be true only if inverter parameter H1-04 = 20 to 2B hex.
17544	95556	30020	External Fault 7	EF7 – External fault signal at terminal 7 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Major</b>	A fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. The input labeled ‘Major’ will be true only if inverter parameter H1-05 = 20 to 2B hex.
17545	95557	30021	External Fault 8	EF8 – External fault signal at terminal 8 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Major</b>	A fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. The input labeled ‘Major’ will be true only if inverter parameter H1-06 = 20 to 2B hex.
17546	95558	30022	<i>Not used</i>							

## Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17547	95559	30023	Overspeed	OS – Motor overspeed. Motor speed exceeded overpspeed level set by inverter parameters F1-08, F1-09.	Yes	Yes	Yes	Minor	<b>Major</b>	Check for correct tach (encoder) PPR value in inverter parameter F1-01. May have excessive noise on encoder signal inputs to Smart Trac AC1 drive. Consult MagneTek about specifications of user-supplied encoder. Major fault declared only if inverter parameter F1-03 ≠ 3, else a minor fault.
17548	95560	30024	Speed Deviation	DEV – Speed deviation. Difference between speed reference and speed feedback exceeded the deviation level set in inverter parameters F1-10, F1-11.	Yes	Yes	Yes	Minor	<b>Major</b>	Decrease load, increase acceleration/deceleration times, or increase deviation levels found at inverter parameters F1-10, F1-11. The input labeled ‘Major’ will be set only if inverter parameters A1-02 = 1 or 3, and d5-01 = 0, and F1-04 ≠ 3.
17549	95561	30025	PG Open	PGO – PG cable wires are disconnected, bad tach, tach is not connected to motor, or missing tach power supply. This is actually a tach loss condition.	Yes	Yes	Yes	Minor	<b>Major</b>	Connect wires from the Smart Trac AC1 PG card to encoder, or look for damaged wires. The input labeled ‘Major’ will be set only if inverter parameters A1-02 = 1 or 3, and d5-01 = 0, and F1-02 ≠ 3.
1754A	95562	30026	Input Pha Loss	PF – Inverter input phase missing. Incoming power supply has an open phase, or a large imbalance exists between L1, L2, and L3.	Yes	Yes	Yes	Minor	<b>Major</b>	Check input AC supply. Note: inverter parameter L8-05 = 1 enables this fault.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 45 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
1754B	95563	30027	Output Pha Loss	LF – Drive output has open phase.	Yes	Yes	Yes	Minor	<b>Major</b>	Check wiring between inverter and motor. Note: inverter parameter L8-07 = 1 enables this fault.
1754C	95564	30028	<i>Not used</i>							
1754D	95565	30029	Oper Disconnect	OPR – Operator disconnected. Digital operator has been disconnected from drive while in Run mode.	Yes	Yes	Yes	Minor	<b>Major</b>	Reconnect digital operator to inverter or disable this fault by setting inverter parameter o2-06 = 0.
1754E	95566	30030	EPROM R/W Err	ERR – EPROM write-in fault. Attempt to write to nonvolatile memory has failed.	Yes	Yes	Yes	Minor	<b>Major</b>	Cycle power and then attempt to initialize. If fault persists, Smart Trac AC1 inverter card is bad.
1754F	95567	30031	<i>Not used</i>							
17550	95568	30032	Memobus Com Err	CE – Communication fault. Control data was not received for 2 seconds after initial communication.	Yes	Yes	Yes	Minor	<b>Major</b>	Check validity of Smart Trac AC1 CPU card firmware and application program. This fault is declared only if H5-04= 0, 1 or 2 and H5-05= 1.
17551	95569	30033	Option Com Err	BUS – Communication fault. Communication fault while drive is set for Run Command and/or Frequency Reference from Smart Trac AC1 CPU card.	Yes	Yes	Yes	Minor	<b>Major</b>	Check validity of Smart Trac AC1 CPU card firmware and application program. Ensure inverter parameters B1-01, B1-02 = 3. Note: The input labeled 'Major' is set only if inverter parameter F9-06 ≠ 3.

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17552	95570	30034	Opt External Flt	EF0 – External fault input from Smart Trac AC1 CPU card.	Yes	Yes	Yes	Minor	<b>Major</b>	Check physical connection between Smart Trac AC1 CPU card and Smart Trac AC1 inverter card. There is a possibility the application program has induced this fault. Note: The input labeled ‘Major’ is set only if inverter parameter F9-03 ≠ 3.
17553	95571	30035	<i>Not used</i>							
17554	95572	30036	Out of Control	CF – Motor out of control. Smart Trac AC1 drive cannot determine speed of motor.	Yes	Yes	Yes	Minor	<b>Major</b>	Note: this applies to open loop vector control mode only (when inverter parameter A1-02 = 2).
17555	95573	30037	Zero Servo Fault	SVE – Zero Servo fault. Motor shaft position changed by more than 500,000 revolutions during zero servo operation.	Yes	Yes	Yes	Minor	<b>Major</b>	Consider not running in zero servo mode, else, limit the number of revolutions the motor turns during Run condition. Note: major fault declared only if inverter parameters A1-02 = 3, and H1-01 to H1-06 = 72, (and that input is asserted) and speed is below b2-01 setting.
17556	95574	30038	<i>Not used</i>							
17557	95575	30039	<i>Not used</i>							
17558	95576	30040	<i>Not used</i>							
17559	95577	30041	<i>Not used</i>							
1755A	95578	30042	<i>Not used</i>							
1755B	95579	30043	<i>Not used</i>							
1755C	95580	30044	<i>Not used</i>							
1755D	95581	30045	<i>Not used</i>							

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 47 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
1755E	95582	30046	<i>Not used</i>							
1755F	95583	30047	CPFxx Hardwr Flt	<p>This corresponds to a series of Smart Trac AC1 inverter faults of type CPFxx where 'xx' stands for the number of the fault as listed below:</p> <p><b>00-</b> COM-ERR (OP&amp;INV). Control circuit fault 1. Communication between Digital Operator and Smart Trac AC1 was not established within 5 seconds after power was applied, or an internal hardware or software fault was detected on power-up.</p> <p><b>01-</b> COM-ERR (OP&amp;INV). Control circuit fault 2. Communication between Digital Operator and Smart Trac AC1 has not occurred within 2 seconds after the last communication, or an internal hardware or software fault was detected after power-up.</p> <p><b>02-</b> BB Circuit Failure. Baseblock circuit fault.</p> <p><b>03-</b> EEPROM Error. EEPROM fault.</p>	Yes	Yes	Yes	Minor	<b>Major</b>	<p><b>00-</b> Possibility boot code does not exist in Smart Trac AC1 CPU card. Check integrity of cable between digital operator and Smart Trac AC1.</p> <p><b>01-</b> Operating system on Smart Trac AC1 CPU card may have stopped running. Application program may be invalid. Check integrity of cable between digital operator and Smart Trac AC1.</p> <p><b>02-</b> Major faults like overspeed or max overheat of drive will cause inverter baseblock of signals to power devices. Recycle Smart Trac AC1 power. If problem persists, replace inverter card.</p> <p><b>03-</b> Attempt to initialize Smart Trac AC1 inverter card. Replace inverter card if failure persists</p> <p><b>04-</b> Replace inverter card.</p> <p><b>05-</b> Replace inverter card.</p> <p><b>06-</b> Check physical connection of both Smart Trac AC1 CPU card and PG card to inverter card.</p> <p><b>21-</b> Smart Trac AC1 CPU card may</p>

## Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
				<p><b>04-</b> Internal A/D Err. Internal A/D fault.</p> <p><b>05-</b> External A/D Err. External A/D fault.</p> <p><b>06-</b> Option Error. Option card connection failure.</p> <p><b>21-</b> Option CPU down. Smart Trac AC1 self-diagnostic error.</p> <p><b>22-</b> Option Type Err. Smart Trac AC1 Model code error.</p> <p><b>23-</b> Option DPRAM Err. Smart Trac AC1 DPRAM error. Dual Port RAM handshake between Smart Trac AC1 CPU card and inverter card has been lost.</p>						<p>be programmed incorrectly. Check for valid Boot, Monitor, and Kernel firmware.</p> <p><b>22-</b> Smart Trac AC1 CPU card may be programmed incorrectly. Check for valid Boot, Monitor, and Kernel firmware. Check Inverter Type in Boot menu: for most cases, value should be set for 2 ms Torq Update.</p> <p><b>23-</b> Check physical connection of both Smart Trac AC1 CPU card and PG card. Application program may be bad or extremely overburdened.</p>
17560	95584	30048	OPExx Param Err	<p>OPE – Operation Error. A general error condition that refers to one of several problems:</p> <p><b>01-</b> kVA Selection. Smart Trac AC1 capacity selection. The inverter's model number has been changed from factory setting or inverter card has been replaced from original.</p> <p><b>02-</b> Limit. Parameter set out of range. Attempt is made to change an inverter setting to a</p>	Yes	Yes	Yes	Minor	<b>Major</b>	<p><b>01-</b> Change inverter parameter o2-04, Inverter Model #, to correct value.</p> <p><b>02-</b> Do not attempt to change an inverter parameter to a value outside the permitted range.</p> <p><b>03-</b> Applies to inverter parameters H1-01 through H1-06: two or more parameters are set to the same data – other than 'F', 'FF', or 20 to 2F hex.</p> <p><b>05-</b> Frequency reference and/or Run</p>

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 49 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17561	95585	30049	<i>Not used</i>	<p>value outside the permitted range.</p> <p><b>03-</b> Terminal. Multi-function input setting fault.</p> <p><b>05-</b> Sequence Select. Option card selection fault.</p> <p><b>06-</b> PG Opt Missing. PG card not installed.</p> <p><b>07-</b> Analog Selection. Multi-function analog input selection fault.</p> <p><b>08-</b> Terminal. Selection parameter fault. A parameter has been changed that is not available in the present control method.</p> <p><b>10-</b> V/F Ptrn Setting. V/f data setting fault.</p> <p><b>11-</b> CarrFrq/ON-Delay. Carrier frequency parameter(s) set out of range.</p>						<p>source is set for option card (Smart Trac.AC1 CPU card) i.e. B1-01, B1-02 = 3, but no option card is connected.</p> <p><b>06-</b> Control method set to flux vector or V/F with PG, and no PG card is installed.</p> <p><b>07-</b> Both multi-function analog inputs on the inverter card, H3-05 and H3-09, have been programmed for the same data (except 1F).</p> <p><b>08-</b> May be trying to change an inverter parameter that is not available in closed loop vector mode.</p> <p><b>10-</b> Occurs when the custom V/f pattern does not meet the following criteria: inverter parameters <math>E1-04 \geq E1-06 &gt; E1-07 \geq E1-09</math>.</p> <p><b>11-</b> Occurs when the carrier frequency inverter parameters are set as follows: <math>C6-01 &gt; 5</math> kHz and <math>C6-02 \leq 5</math> kHz; <math>C6-03 &gt; 6</math> and <math>C6-01 &lt; C6-02</math>.</p>

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 50 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17562	95586	30050	<i>Not used</i>							
17563	95587	30051	CPF02 Fault	BB Circuit Failure. Baseblock circuit fault.	Yes	Yes	Yes	Minor	<b>Major</b>	Major faults like overspeed or max overheat of drive will cause inverter baseblock of signals to power devices. Recycle Smart Trac AC1 power. If problem persists, replace inverter card.
17564	95588	30052	CPF03 Fault	EEPROM Error. EEPROM fault.	Yes	Yes	Yes	Minor	<b>Major</b>	Attempt to initialize Smart Trac AC1 inverter card. Replace inverter card if failure persists
17565	95589	30053	CPF04 Fault	Internal A/D Err. Internal A/D fault.	Yes	Yes	Yes	Minor	<b>Major</b>	Replace inverter card.
17566	95590	30054	CPF05 Fault	External A/D Err. External A/D fault.	Yes	Yes	Yes	Minor	<b>Major</b>	Replace inverter card.
17567	95591	30055	CPF06 Fault	Option Error. Option card connection failure.	Yes	Yes	Yes	Minor	<b>Major</b>	Check physical connection of both Smart Trac AC1 CPU card and PG card to inverter card.
17568	95592	30056	<i>Not used</i>							
17569	95593	30057	<i>Not used</i>							
1756A	95594	30058	<i>Not used</i>							
1756B	95595	30059	<i>Not used</i>							
1756C	95596	30060	<i>Not used</i>							
1756D	95597	30061	<i>Not used</i>							
1756E	95598	30062	<i>Not used</i>							
1756F	95599	30063	<i>Not used</i>							
17570	95600	30064	<i>Not used</i>							
17571	95601	30065	CPF20 Fault	Option A/D fault in analog Speed Reference card.	Yes	Yes	Yes	Minor	<b>Major</b>	The Smart Trac main CPU card may be faulty. If available, download a

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 51 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
										small test program to see if fault persists.
17572	95602	30066	CPF21 Fault	Option CPU down. Smart Trac AC1 self-diagnostic error.	Yes	Yes	Yes	Minor	<b>Major</b>	Smart Trac AC1 CPU card may be programmed incorrectly. Check for valid Boot, Monitor, and Kernel firmware.
17573	95603	30067	CPF22 Fault	Option Type Err. Smart Trac AC1 Model code error.	Yes	Yes	Yes	Minor	<b>Major</b>	Smart Trac AC1 CPU card may be programmed incorrectly. Check for valid Boot, Monitor, and Kernel firmware. Check Inverter Type in Boot menu: for most cases, value should be set for 2 ms Torq Update.
17574	95604	30068	CPF23 Fault	Option DPRAM Err. Smart Trac AC1 DPRAM error. Dual Port RAM handshake between Smart Trac AC1 CPU card and inverter card has been lost.	Yes	Yes	Yes	Minor	<b>Major</b>	Check physical connection of both Smart Trac AC1 CPU card and PG card. Application program may be bad or extremely overburdened.
17575	95605	30069	<i>Not used</i>							
17576	95606	30070	<i>Not used</i>							
17577	95607	30071	<i>Not used</i>							
17578	95608	30072	<i>Not used</i>							
17579	95609	30073	<i>Not used</i>							
1757A	95610	30074	<i>Not used</i>							
1757B	95611	30075	<i>Not used</i>							
1757C	95612	30076	<i>Not used</i>							
1757D	95613	30077	<i>Not used</i>							

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 52 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
1757E	95614	30078	<i>Not used</i>							
1757F	95615	30079	<i>Not used</i>							
17580	95616	30080	<i>Not used</i>							
17581	95617	30081	OPE1 Fault	kVA Selection. Smart Trac AC1 capacity selection. The inverter's model number has been changed from factory setting or inverter card has been replaced from original.	Yes	Yes	Yes	Minor	<b>Major</b>	Change inverter parameter o2-04, Inverter Model #, to correct value.
17582	95618	30082	OPE2 Fault	Limit. Parameter set out of range. Attempt is made to change an inverter setting to a value outside the permitted range.	Yes	Yes	Yes	Minor	<b>Major</b>	Do not attempt to change an inverter parameter to a value outside the permitted range. May need to do a 2-wire reset to drive
17583	95619	30083	OPE3 Fault	Terminal. Multi-function input setting fault.	Yes	Yes	Yes	Minor	<b>Major</b>	Applies to inverter parameters H1-01 through H1-06: two or more parameters are set to the same data – other than 'F', 'FF', or 20 to 2F hex.
17584	95620	30084	<i>Not used</i>							
17585	95621	30085	<i>Not used</i>							
17586	95622	30086	OPE6 Fault	PG Opt Missing. PG card not installed.	Yes	Yes	Yes	Minor	<b>Major</b>	Control method set to flux vector or V/F with PG, and no PG card is installed. Ensure that A1-02= 1 or 3.
17587	95623	30087	<i>Not used</i>							
17588	95624	30088	<i>Not used</i>							
17589	95625	30089	<i>Not used</i>							

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 53 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
1758A	95626	30090	OPE10 Fault	V/F Ptrn Setting. V/f data setting fault.	Yes	Yes	Yes	Minor	<b>Major</b>	Occurs when the custom V/f pattern does not meet the following criteria: inverter parameters $E1-04 \geq E1-06 > E1-07 \geq E1-09$ .
1758B	95627	30091	OPE11 Fault	CarrFrq/ON-Delay. Carrier frequency parameter(s) set out of range.	Yes	Yes	Yes	Minor	<b>Major</b>	Occurs when the carrier frequency inverter parameters are set as follows: $C6-01 > 5 \text{ kHz}$ and $C6-02 \leq 5 \text{ kHz}$ ; $C6-03 > 6$ and $C6-01 < C6-02$ .
1758C – 175F7	95628 – 95735	30092 – 30199	<i>Not used</i>							
175F8	95736	30200	Alm:Undervoltage	UV – Main circuit undervoltage. Occurs 2 seconds after detection of low voltage. Detection levels: 190VDC for 230V rated unit; 380VDC for 460V rated unit; 546VDC for 600V rated unit.	Yes	Yes	Yes	Minor	<b>Minor</b>	Check input AC supply. Possibility of erroneous operation due to noise: remove noise source by connecting surge suppressor to relay and magnetic contactor coils; provide line filter to remove noise on input power line. Possibility of gate drive PCB is faulty. Note: alarm is declared only if drive is NOT in Run mode.

10/17/00



New Berlin  
Technology Center

*Smart Trac*  
*Product Development*  
*Design Document*

Faults.doc

Rev. # 19 Page 54 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
175F9	95737	30201	Alm:DC Bs Ovrvlt	OV – Overvoltage. Detection levels: 400VDC for 230V rated unit; 800VDC for 460V rated unit; 1050VDC for 600V rated unit.	Yes	Yes	Yes	Minor	Minor	Check input AC supply. Possibility of erroneous operation due to noise: remove noise source by connecting surge suppressor to relay and magnetic contactor coils; provide line filter to remove noise on input power line. Note: The input labeled 'Minor' is declared only if drive is NOT in Run mode and only if this is programmed as an ALARM.
175FA	95738	30202	Alm:Htsnk Ovrtpm	OH – Cooling fin overheat. Heatsink fin temperature exceeded preset value found in inverter parameter L8-02.	Yes	Yes	Yes	Minor	Minor	Alarm declared only if inverter parameter L8-03 = 3. Reduce ambient temperature to less than 45°C (113° F). Clean heat sink. Replace cooling fan if necessary.
175FB	95739	30203	Alm: Over Heat 2	OH2 – External detection of heatsink overtemp. One of H1-01 through H1-06 is programmed for this alarm and that terminal input is closed.	Yes	Yes	Yes	Minor	Minor	Reduce ambient temperature to less than 45°C (113° F). Clean heat sink. Replace cooling fan if necessary
175FC	95740	30204	Alm:Ovrtrq Det 1	OL3 – Overtorque detect 1 alarm. Output torque exceeded the Overtorque Detection Level 1 set in L6-02 for vector control.	Yes	Yes	Yes	Minor	Minor	The input labeled 'Minor' is set only if L6-01 = 1 or 2. Reduce load, increase acceleration time, or increase inverter parameter setting L6-02.

## Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
175FD	95741	30205	Alm:Ovrtrq Det 2	OL4 – Overtorque detect 2 alarm. Output current exceeded Overtorque Detection Level 2 set in inverter parameter L6-05. For V/F control, parameter L6-05 is considered to be Output Current.	Yes	Yes	Yes	Minor	<b>Minor</b>	The input labeled ‘Minor’ is set only if L6-01 = 1 or 2. Reduce load, increase acceleration time, or increase inverter parameter setting L6-02.Reduce load, increase acceleration time, or increase inverter parameter setting L6-05.
175FE	95742	30206	Alm:External Flt	Both FWD and RUN commands are simultaneously input for 500ms or longer.	Yes	Yes	Yes	Minor	<b>Minor</b>	Check input wiring to ensure that FWD and REV are mutually exclusive.
175FF	95743	30207	Alm: BB Circuit	Base Block activated by external contact into terminal programmed for base block.	Yes	Yes	Yes	Minor	<b>Minor</b>	Note: Assuming one of the input terminals is programmed for external BB and the BB is being asserted by an external contact, an overspeed or max overheat of drive will cause inverter BB of signals to the power devices. Recycle SmartTrac AC1 power. If problem persists, replace inverter card.
17600	95744	30208	Alm: Ext Fault 3	EF3 – External fault signal at terminal 3 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Minor</b>	Fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. Alarm declared only if H1-01 is in the range of 2Ch to 2Fh.

## Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17601	95745	30209	Alm: Ext Fault 4	EF4 – External fault signal at terminal 4 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Minor</b>	Fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. Alarm declared only if H1-02 is in the range of 2Ch to 2Fh.
17602	95746	30210	Alm: Ext Fault 5	EF5 – External fault signal at terminal 5 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Minor</b>	Fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. Alarm declared only if H1-03 is in the range of 2Ch to 2Fh.
17603	95747	30211	Alm: Ext Fault 6	EF6 – External fault signal at terminal 6 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Minor</b>	Fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. Alarm declared only if H1-04 is in the range of 2Ch to 2Fh.
17604	95748	30212	Alm: Ext Fault 7	EF7 – External fault signal at terminal 7 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Minor</b>	Fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. Alarm declared only if H1-05 is in the range of 2Ch to 2Fh.
17605	95749	30213	Alm: Ext Fault 8	EF8 – External fault signal at terminal 8 of the inverter card. This can be programmed to be N.O. or N.C. contact.	Yes	Yes	Yes	Minor	<b>Minor</b>	Fault has occurred in circuits outside the Smart Trac AC1 inverter card. Troubleshoot and correct. Alarm declared only if H1-06 is in the range of 2Ch to 2Fh.
17606	95750	30214	Alm: Fan Failure	Drive Cooling fan has failed.	Yes	Yes	Yes	Minor	<b>Minor</b>	Check drive cooling fan.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 57 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
17607	95751	30215	Alm: Overspd Det	OS – Motor overspeed alarm. Motor speed exceeded overspeed level set by inverter parameters F1-08, F1-09.	Yes	Yes	Yes	Minor	<b>Minor</b>	Check for correct tach (encoder) PPR value in inverter parameter F1-01. May have excessive noise on encoder signal inputs to Smart Trac AC1 drive. Consult MagneTek about specifications of user-supplied encoder. Alarm declared only if inverter parameter F1-03 = 3.
17608	95752	30216	Alm: Spd Deviatn	DEV – Speed deviation alarm. Difference between speed reference and speed feedback exceeded the deviation level set in inverter parameters F1-10, F1-11.	Yes	Yes	Yes	Minor	<b>Minor</b>	Decrease load, increase acceleration/deceleration times, or increase deviation levels found at inverter parameters f1-10, f1-11. Alarm declared if f1-04 = 3. The input labeled ‘Minor’ is active only if a1-02 = 1 or 3, AND d5-01 = 0.
17609	95753	30217	Alm: PG Open	PGO – Alarm; No tach pulses received when speed reference > 0 in time set by f1-14. This is the same as a Tach Loss fault.	Yes	Yes	Yes	Minor	<b>Minor</b>	Check wires from the Smart Trac AC1 PG card to encoder, faulty tach, faulty tach power supply or look for damaged wires. The alarm is declared only if inverter parameters a1-02 = 1 or 3, and d5-01= 0, and f1-02= 3
1760A	95754	30218	Alm: Oper Disc	OPR – Operator disconnected. Digital operator has been disconnected from drive while in Run mode.	Yes	Yes	Yes	Minor	<b>Minor</b>	Reconnect digital operator to inverter. Alarm is declared if o2-06= 0.

10/17/00



New Berlin  
Technology Center

**Smart Trac**  
Product Development  
Design Document

Faults.doc

Rev. # 19 Page 58 of 64

Title: Fault Declarations

Displayed Fault No.		Internal Fault No.	Fault Legend	Description	Priority Display?	Newest List?	Oldest List?	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager									
1760B	95755	30219	Alm:Memobus Comm	CE – Communication fault. Control data was not received for 2 seconds after initial communication.	Yes	Yes	Yes	Minor	<b>Minor</b>	This is a serial communications error. If h5-05=1, then the alarm bit will be set if no serial communication is seen AND h5-04= 3. Check validity of Smart Trac AC1 CPU card firmware and application program.
1760C	95756	30220	Alm:Mtr Overlded	OL1 – Motor overload. Protects the motor. Motor thermal overload protection has tripped. Inverter parameter L1-02 has been exceeded (initial value: 150% for 60 sec.).	Yes	Yes	Yes	Minor	<b>Minor</b>	Alarm is declared if thermal overload exceeds 90% of fault detection level AND L1-01= 1. Load may be too large. Check drive capacity (inverter parameter o2-04) for correct factory setting. Check for proper setting of electronic thermal overload setting: inverter parameters E1-02, E2-01, L1-02. Try disconnecting motor wiring from output terminals – if OL is still indicated, problem may be due to noise or faulty inverter cards
1760D	95757	30221	Alm:Inv Overlded	OL2 – Drive overload. Protects the Smart Trac AC1 drive. Drive overload protection has tripped.	Yes	Yes	Yes	Minor	<b>Minor</b>	See fault “Motor Overloaded” for details.

Title: Fault Declarations

## 7. IO Subsystem

The following section details fault numbers assigned to the Smart Trac AC1 IO Subsystem.

### Notes:

- Fault legend cannot be changed in this section.
- Internal fault values do not apply here. IO Subsystem faults are not added with 10000 HEX.
- As of this printing, IO Subsystem faults cannot be displayed in the Fault Manager. Because of this, IO Subsystem faults cannot be assigned to a program input.
- TBD = To Be Determined.
- N/A = Not Applicable.
- For all faults listed in the section, the Corrective action is the same: Verify that there are no hardware problems on the PC used to create the application. Re-compile and reload the program and reload it to the SmartTrac drive. The Smart Trac main CPU card may be faulty. If available, download a small test program to see if fault persists.

Displayed Fault No.		Fault Legend	Description	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager					
90000000	TBD	<i>Not a fault</i>				
90000001	TBD	IO Scan Init Flt	I/O Scan Manager is already initialized. Issue IO_SHUTDOWN before attempting to restart.	Major	N/A	See above.
90000002	TBD	IO Scan Uninit	I/O Scan Manager has not been initialized. Issue an IO_STARTUP command before proceeding.	Major	N/A	See above.
90000003	TBD	IO Memory Fail	Memory allocation (malloc/calloc) failed.	Critical	N/A	See above.
90000004	TBD	IO Load Library	Unable to perform a load library on a driver DLL. DLL may not have been downloaded or may not have exported DllEntryPoint.	Critical	N/A	See above.
90000005	TBD	IO DLL Addr Fail	Unable to GetProcAddress on a required driver DLL function. DLL may not have been downloaded, may be an old version, or may not export all required functions.	Critical	N/A	See above.
90000006	TBD	IO Thread Create	Unable to create a required I/O thread during I/O startup.	Critical	N/A	See above.
90000007	TBD	IO Thread Delete	Unable to delete a required I/O thread during I/O shutdown.	Critical	N/A	See above.
90000008	TBD	IO Event Create	Unable to create a required event during I/O startup.	Critical	N/A	See above.
90000009	TBD	IO Bad Driver	Driver version is incompatible with the I/O Scan Manager.	Critical	N/A	See above.

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Print Date: 10/17/00

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager					
9000000A	TBD	IO Num Of Cards	Number of cards requested in startup exceeds limit.	Critical	N/A	See above.
9000000B	TBD	IO Unknown Req	Caller requested something unsupported by the I/O Scan Manager. This is a critical fault, because the I/O Scan Manager assumes the runtime engine is confused.	Critical	N/A	See above.
9000000C	TBD	IO Unknown Card	Caller attempted to connect to a card that does not exist in the I/O Scan Manager's list of cards.	Major	N/A	See above.
9000000D	TBD	IO Bad Handle	Caller attempted an I/O operation with an invalid handle. Handles are created via IO_CONNECT_CARD.	Major	N/A	See above.
9000000E	TBD	IO Queue Size	An error was detected while trying to shrink the I/O request queue. Either the caller tried to shrink it to less than it's minimum size or there were more items in the queue than the requested size. The queue is resized during an IO_STARTUP or IO_SHUTDOWN request.	Critical	N/A	See above.
9000000F	TBD	IO Queue Ovrflow	An I/O driver's or the I/O Scan Manager's queue overflowed.	Critical	N/A	See above.
90000010	TBD	IO Queue Empty	An I/O driver's or the I/O Scan Manager's queue is empty.	Major	N/A	See above.
90000011	TBD	IO Invalid Queue	An attempt was made to access a non-existent driver queue.	Critical	N/A	See above.
90000012	TBD	IO Image Overrun	An attempt was made to write beyond the boundaries of an I/O Image. This typically means the caller is confused about the size of the image or somehow memory was corrupted.	Critical	N/A	See above.
90000013	TBD	IO Access Fault	A NULL pointer was passed to the I/O Scan Manager.	Critical	N/A	See above.
90000014	TBD	IO Driver Fail	An I/O driver or one or more of its cards failed to start.	Major	N/A	See above.
90000015	TBD	IO Req Cancel	An I/O request was cancelled. Typically this happens when one or more I/O requests are in the I/O Scan Manager's queue when it is executing an IO_SHUTDOWN command. The I/O Scan Manager clears the queue, returning a status of IO_REQUEST_CANCELLED for all requests.	Major	N/A	See above.
90000016	TBD	IO Invalid Count	For multi-card commands, such as SET_SCAN_MODE, an invalid card count was submitted. For example, zero.	Major	N/A	See above.

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Rev. # 19 Page 61 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager					
90000017	TBD	IO Bad Start Seq	Unknown start sequence requested.	Major	N/A	See above..
90000018	TBD	IO Bad Scan Mode	An unknown scan mode was requested.	Major	N/A	See above.
90000019	TBD	IO Function Bad	Function is currently unsupported, but a stub exists.	Major	N/A	See above.
9000001A	TBD	IO Card Owned	The I/O Scan Manager has already established a connection to an I/O card. Only one owner is allowed.	Major	N/A	See above.
9000001B	TBD	IO Card Faulted	The I/O card reported a fault. Operation not performed.	Major	N/A	See above.
9000001C	TBD	IO Invalid Size	Writes to the I/O Image and to the cards must have a length of at least one byte. Operation not performed.	Major	N/A	See above.
9000001D	TBD	IO Shutdown Mode	An unknown shutdown mode was requested.	Major	N/A	See above.
9000001E	TBD	IO Unknown State	An unknown safe state.	Major	N/A	See above.
9000001F	TBD	IO Watchdog Valu	Watchdog period must be 0 (disabled) or positive number.	Major	N/A	See above..
90000020	TBD	IO Watchdog Flt	I/O Scan Manager-to-driver watchdog expired.	Major	N/A	See above.
90000021	TBD	IO Unknown CTRL	Unsupported I/O control for this I/O driver.	Major	N/A	See above.
90000022	TBD	IO Pending	Asynchronous request is pending.	Major	N/A	See above.
90000023	TBD	IO Event Missing	I/O event (not to be confused with OS event) not found.	Major	N/A	See above.
90000024	TBD	IO Scan Mgr Flt	I/O Scan Manager is not responding to service requests.	Critical	N/A	See above.
90000025	TBD	IO Global Input Fail	Failed to update global I/O image.	Major	N/A	See above.
90000026	TBD	IO Card Output Fail	Failed to write global output image to card.	Major	N/A	See above.
90000027	TBD	IO Driver Faulted	I/O Driver is faulted.	Major	N/A	See above.
90000028	TBD	IO Scan Mgr Flt	I/O Scan Manager thread is faulted.	Critical	N/A	See above.
90000029	TBD	IO Driver Server	I/O Driver Service thread is faulted.	Critical	N/A	See above.
9000002A	TBD	IO Card Deadlock	I/O card access is deadlocked.	Major	N/A	See above.
9000002B	TBD	IO Card Offline	I/O card is offline or faulted.	Major	N/A	See above..
9000002C	TBD	IO Duplct Driver	I/O driver has multiple entries.	Critical	N/A	See above.
9000002D	TBD	IO Que Deadlock	I/O queue access is deadlocked.	Critical	N/A	See above.

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Rev. # 19 Page 62 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager					
9000002E	TBD	IO Unload Driver	Unload of I/O driver failed. The driver must first be shutdown before unloading.	Major	N/A	See above.
9000002F	TBD	IO Drivr Deadloc	I/O driver object access is deadlocked.	Critical	N/A	See above.
90000030	TBD	IO No Card Start	I/O card has not started.	Major	N/A	See above.
90000031	TBD	IO File Open Flt	Unable to EmbFopen the file. File does not exist.	Major	N/A	See above.
90000032	TBD	IO Driver Name	Driver name in INI file does not match actual driver name.	Major	N/A	See above.
90000033	TBD	IO Bad Parameter	Parameter in INI file is invalid.	Major	N/A	See above.
90000034	TBD	IO Exception Flt	I/O Subsystem encountered an unhandled exception and is expecting caller to invoke fault handler.	Critical	N/A	See above.
90000035	TBD	IO Unknown IRQ	An invalid IRQ number was used in an attempt to connect to an interrupt.	Major	N/A	See above.
90000036	TBD	IO IRQ Reserved	An attempt was made to connect to a reserved interrupt, i.e., another driver/card has already claimed the interrupt for exclusive access.	Major	N/A	See above.
90000037	TBD	IO Card Cfg Flt	An I/O card failed to start. The driver was unsuccessful in starting the card due to H/W or configuration failure.	Major	N/A	See above.
90000038	TBD	IO Object Uninit	The driver was unable to initialize a Device Object due to a problem with the INI file or insufficient system resources.	Major	N/A	See above.
90000039	TBD	IO Oper Timeout	Asynchronous I/O operation timed out before completion.	Major	N/A	See above.
9000003A	TBD	IO Card Cmd Flt	I/O Card reported failure of command issued to it.	Major	N/A	See above..
9000003B	TBD	IO Cmd Not Done	I/O Card has a command in progress and is unable to execute/queue another command.	Major	N/A	See above.
9000003C	TBD	IO No Sync Allow	I/O Card does not support synchronization.	Major	N/A	See above.
9000003D	TBD	IO Invalid OS	I/O Card does not support this Operating System.	Major	N/A	See above.
9000003E	TBD	IO RTE Exception	I/O Subsystem encountered an unhandled exception in the RTE Service Thread and is expecting caller to invoke fault handler.	Critical	N/A	See above.
9000003F	TBD	IO ISR Thread	EmbIsrWorkerThread()'s WaitForSingleObject returned an unexpected result.	Major	N/A	See above.

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Rev. # 19 Page 63 of 64

Title: Fault Declarations

Displayed Fault No.		Fault Legend	Description	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager					
90000040	TBD	IO Bad Card Stat	Bad Card status is returned from IoDrvSetScanMode().	Major	N/A	See above.
90000041	TBD	IO Event Size	Event Size is invalid.	Major	N/A	See above.
90000042	TBD	IO Event Type	Event Type is invalid.	Major	N/A	See above.
90000043	TBD	IO Fail	Generic error code.	Major	N/A	See above.

Title: Fault Declarations

## 8. Boot

The following section details faults assigned to the Smart Trac AC1 Boot, announced during power up.

Notes:

- There are no fault numbers associated with Boot code.
- Boot faults cannot be displayed in Control Node Monitor nor Fault Manager.
- Severity and Assign Program Input are listed as 'N/A' (Not Applicable) here. Although these faults are considered as major, the Fault Manager cannot configure nor report them.

Displayed Fault No.		Fault Legend	Description	Severity	Assign Program Input	Corrective Action
Control Node Monitor	Fault Manager					
N/A	N/A	No Drive Comms	Communications between Smart Trac AC1 CPU card and inverter card have not been established.	N/A	N/A	Smart Trac AC1 CPU card may not be connected to inverter card. Inverter FLASH code may be incorrect. Note: press ESC key to bypass communications with inverter card, and jump into the operating system.
N/A	N/A	No Monitor or OS	Boot cannot detect valid Monitor firmware in the Smart Trac AC1 CPU card.	N/A	N/A	Monitor is either defective or hasn't been installed. Load new Monitor firmware into Smart Trac AC1 CPU card, with JTAG programmer.
N/A	N/A	CPF00 COM-ERR(OP&INV)	Communications between the Digital Operator and Smart Trac AC1 was not established within 5 seconds after power was applied.	N/A	N/A	Possibility boot code does not exist in Smart Trac AC1 CPU card. Check integrity of cable between digital operator and Smart Trac.
N/A	N/A	CPF01 COM-ERR(OP&INV)	Communications between the Digital Operator and Smart Trac AC1 have not taken place for a least 2 seconds (after communications had already been established).	N/A	N/A	Operating system on Smart Trac AC1 CPU card may have stopped running. Monitor and/or Kernel firmware may be defective or missing. Application program may be invalid. Check integrity of cable between digital operator and Smart Trac AC1.

# SMART TRAC AC1 Fault Tables

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