BIDP

ProfiBus-DP® Interface

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Notes are used to call attention to information that is significant to the understanding and operation of equipment.

This BALOGH manual is based on information available at the time of its publication. We have attempted to provide accurate and up-to-date information. This document does not purport to cover all details or variations in hardware or software; nor does it provide for every possible combination of products. Some features described herein may not be available on all like products. BALOGH assumes no obligation to notify holders of this document of any subsequent changes.

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Introduction

The BALOGH BIDP is an IP-65 rated field mountable RFID interface connecting to the ProfiBus-DP® Network. Each BIDP unit controls up to (2) BALOGH Transceivers and is a slave device controlling communications between the BALOGH TAG and Transceiver. Each device is Node ID selectable 0-125 by DIP switches.

The ProfiBus-DP® Network communicates with a token passing procedure between master and master-slave procedures for slaves at baud rates from 9.6k bit/sec to 12m bit/sec via RS-485 (twisted pair, two wire cable). The BIDP is configured as an I/O device on the Bus. The BALOGH BIDP GSD file provides multiple I/O configurations from 8 bytes in/out up to 192 bytes in/out, which allows greater flexibility for the user's application. See BALOGH GSD file for available configurations.

The technology used provides 100% data integrity even in the harshest environments.
Areas of application include:

- Palletized Systems
- Process Controls
- Product Tracking
- AS/RS Systems
- Automated Manufacturing & Assembly

BIDP Diagnostics:

For every scan of the ProfiBus-DP® Network, each BIDP on the network returns (1) byte of status for each channel within the command frame structure (see Structure of Frames).

Each byte provides the following diagnostic information:

- Command Execution Status
- Low Battery (For SRAM memory back-up, not used on EEPROM or Ferro Electric TAGS)
- TAG Presence
- Error Code

BALOGH Status Byte:

MSB 7	6	5	4	3	2	1	LSB 0
EXE Bit	Low Battery	TAG Pre	Error Bit	Error Code	Error Code	Error Code	Error Code

Bit 7) EXE Bit = Command Execution Status (1=Command Complete) (0=Command In Progress)
Bit 6) Low Batt = (0=Battery OK) (1=Low Battery) (1= Manual Communications Mode if no TAG Present)
Bit 5) TAG Pre = TAG Presence (0=No TAG Present) (1=TAG Present)
Bit 4) Error Bit = (0=No Error) (1=Error, See Error Code)
Bits 3,2,1,0) Error Code :

0001 = Invalid Length Error
0010 = PIC Watchdog Error
0011 = PIC Reset Error
0101 = PIC Dialogue Error
1100 = Transceiver Error
1110 = TAG Memory Fault
1111 = TAG Dialogue Error

Reminder About Coding Systems

Electronic TAG:

BALOGH passive RFID TAGS are independent of a power supply. They receive the necessary energy for operation from an electromagnetic field emitted by a Transceiver. The BALOGH BIDP allows the Reading and/or Writing of BALOGH TAG types:

OF/OFR: Read-Only TAG. Data is factory programmed to user specification.
OFR TAGS are user re-programmable.
Capacity: 7 bytes

OMA: Read/Write TAG. Data is stored in Ferro-Electric memory.
Capacity: 64 bytes,
2K bytes, or 8K bytes

OMX: High Speed Read/Write TAG. Data is stored in Ferro-Electric Memory.
Capacity: 8K bytes
or 32 bytes

GIE: **Read/Write TAG. Data is stored in Ferro Electric memory**
Capacity: 512 bytes
2K, or 8K bytes

OL/OLR: **Read-Only Extended Range TAGS.**
Data is factory programmed to users specifications.
OLR TAGS are user re-programmable. **Capacity: 2 bytes**

OIR: **Infrared Read/Write TAG** **Capacity 32 bytes**

Transceiver:

The Transceiver communicates with a passive BALOGH RFID TAG by way of an inductive electromagnetic field emitted by the Transceiver, allowing data communication with the TAG.

Interface Control Board:

The BIDP unit processes data, commands, and works as an interface between the BALOGH RFID TAG and the ProfiBus-DP® Network.

BIDP Connection

TR #1	24VDC	TR#2	ProfiBus-DP® Connection

ProfiBus-DP®: ProfiBus-DP® connection from PLC, PC, or previous ProfiBus-DP® unit.

TR #1: BALOGH Transceiver connection for Channel #1. Use BALOGH Transceiver cable, M-F/EXT/**.

TR #2: BALOGH Transceiver connection for Channel #2. Use BALOGH Transceiver cable, M-F/EXT/**.

24VDC: BALOGH BIDP 24VDC Power Connection. Use BALOGH cable, SEF-ST/* or PWR24/EXT/0.5M Pin 4= 24VDC Power, Pin 2= 0VDC.

Note:

* 2 meter, 5 meter, 25 ft., 50 ft., 75 ft., 100 ft., 125 ft., and 150 ft. cables are standard BALOGH lengths for SEF-ST/* cables. Other cable lengths are available upon request. PWR24/EXT/0.5M is available only in 0.5 meters.

** 2 meter, 5 meter, and 10 meter cables are standard BALOGH lengths for M-F/EXT/* cable. Other cable lengths are available upon request.

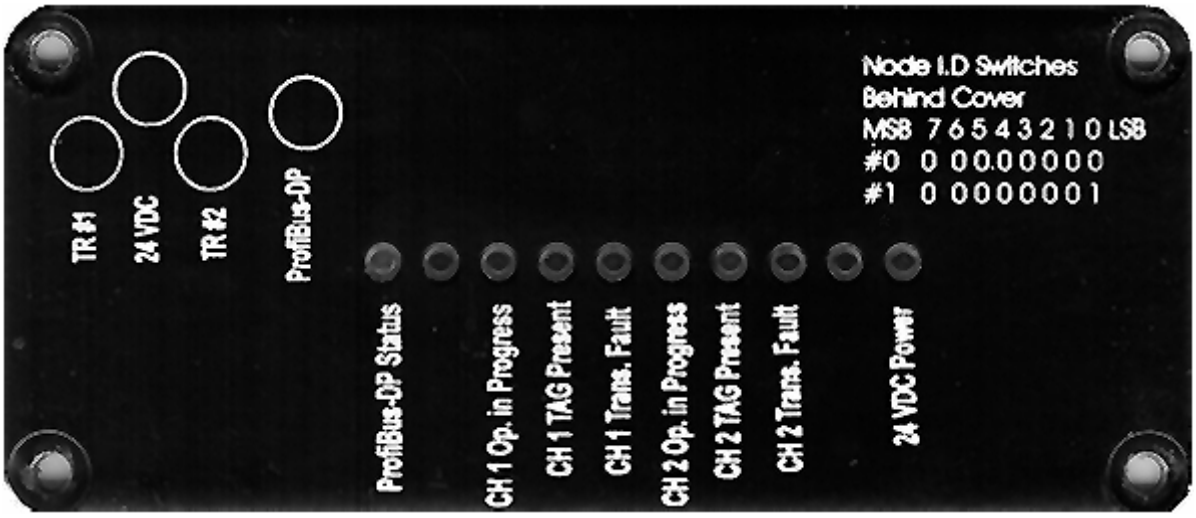
BIDP Node ID Addressing & Transceiver Communications Mode:

The BALOGH BIDP is Node ID selectable by a bank of 7 DIP switches (8 DIP switches total). The DIP switches are located behind the status LED end cap on the IP-65 rated enclosure. ProfiBus-DP® allows Node selection from 0 to 125. DIP switch settings on the BIDP are active upon powering up of the unit. If changes are made to Node ID or communications mode, power must be cycled to the unit.

Switches:

	MSB	8	7	6	5	4	3	2	1	LSB
Node ID #	0	*	0	0	0	0	0	0	0	
	1	*	0	0	0	0	0	0	1	
	2	*	0	0	0	0	0	1	0	
	*									
	125	*	1	1	1	1	1	0	1	
Transceiver	Auto Mode	0	*	*	*	*	*	*	*	
Communications Mode	Manual Mode	1	*	*	*	*	*	*	*	

Operation & Fault Indications



LED #1: ProfiBus-DP® Status
Bi-Color LED indicating status of the BIDP on the ProfiBus® Network. **Solid Green**= BIDP Ready, ProfiBus® Initialized, **Blinking Green**= BIDP Ready, ProfiBus® not Initialized, **Solid Red**= Error at ProfiBus® Initialization or while Bus was operating, **Blinking Red**= BIDP disconnected from Bus after Initialization or ProfiBus® has been stopped.

LED #2: Not Used

LED #3: Channel #1 Operation In Progress
Green LED indicating a command has been received and is in progress for Transceiver #1.

LED #4: TAG Presence Channel #1
Green LED indicating that a TAG is in the zone/range of Transceiver #1**.**

LED #5: Transceiver Fault Channel #1
Red LED indicating a fault condition with Transceiver #1 or in the cable connecting the Transceiver to the BIDP.

LED #6: Channel #2 Operation in Progress
Green LED indicating a command has been received and is in progress for Transceiver #2.

LED #7: TAG Presence Channel #2
Green LED indicating that a TAG is in the zone/range of Transceiver #2.

LED #8: Transceiver Fault Channel #2
Red LED indicating a fault condition with Transceiver #2 or in the cable connecting the Transceiver to the BIDP.

LED #9: Not Used

LED #10: 24VDC Power
Green LED indicating 24VDC power. Power is supplied to the BIDP via an external 24VDC regulated power supply.

BALOGH GSD File

```
;BALOGH BIDP RFID INTERFACE FOR PROFI-BUS DP®
;BALOGH, 7699 KENSINGTON COURT, BRIGHTON, MI 48116 (248) 486-RFID
;DATE : 10.20.97
;
;
;
#Profibus_DP
Vendor_Name = "BALOGH"
Model_Name = "BALOGH BIDP"
Revision = "REV. 1"
Ident_Number = 0x0008
Protocol_Ident = 0
Station_Type = 0
FMS_supp = 0
Hardware_Release = "Rel-01"
Software_Release = "Soft-01"
9.6_supp = 1
19.2_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp=1
6M_supp=1
12M_supp=1
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
MaxTsdr_6M = 450
MaxTsdr_12M = 800
Redundancy = 0
Repeater_Ctrl_Sig = 2
24V_Pins = 0
;
;--Slave Specification-----
;
Freeze_Mode_supp = 1
Sync_Mode_supp = 1
Auto_Baud_supp = 1
Set_Slave_Add_supp = 0
User_Prm_Data_Len = 05
User_Prm_Data = 0x00, 0x00, 0x00, 0x00, 0x00
Min_Slave_Intervall = 1
Modular_Station = 1
Max_Module = 32
Max_Input_Len = 192
Max_Output_Len = 192
Max_Data_Len = 384
;;
CONFIGURATION SELECTIONS
Module = "96 WORDS In / 96 WORDS Out" 0xDF, 0xDF, 0xDF, 0xDF, 0xDF, 0xDF, 0xEF,  0xEF, 0xEF, 0xEF, 0xEF, 0xEF, 0xEF
EndModule
Module = "80 WORDS In / 80 WORDS Out" 0xDF, 0xDF, 0xDF, 0xDF, 0xDF, 0xEF, 0xEF, 0xEF, 0xEF, 0xEF
EndModule
Module = "64 WORDS In / 64 WORDS Out" 0xDF, 0xDF, 0xDF, 0xDF, 0xEF, 0xEF, 0xEF, 0xEF
EndModule
Module = "48 WORDS In / 48 WORDS Out" 0xDF, 0xDF, 0xDF, 0xEF, 0xEF, 0xEF
EndModule
Module = "32 WORDS In / 32 WORDS Out" 0xDF, 0xDF, 0xEF, 0xEF
EndModule
Module = "16 WORDS In / 16 WORDS Out" 0xDF, 0xEF
EndModule
Module= “16 BYTES In / 16 BYTES Out “ 0x9F , 0xAF
EndModule
Module= “8 BYTES In / 8 BYTES Out “0x97 , 0xA7"
```

TAG Addressing

TAG	Memory Availability	Addressing (Linear Byte Addressing)
OF/OFR	7 bytes	0 to 6
OIR	64 bytes	0 to 65535
OL/OLR	2 bytes	0 to1
OMA	64 bytes 2K bytes 8K bytes	2048 to 2112 0 to 2047 0 to 8180
OMX	8K bytes 32K bytes	0 to 8180 0 to 32767
GIE	512 bytes 2K bytes 8K bytes	0 to 511 0 to 2047 0 to 8180
OP	64 bytes	0 to 63 (Read) 12 to 75 (Write)

Must Read/Write in blocks of (4) bytes to OP TAG

BIDP Structure of Frames

The first byte in the BIDP ProfiBus-DP® frame is the Protocol Byte. The Protocol Byte contains the command type, channel number, modulus (2) counter, acknowledgment bit (ACK), data bit, and command bit.

The command type bits tell the BIDP what operation to perform or if the frame is the last frame of data on a multi-frame command. The channel number distinguishes what Transceiver the command is for. The modulus (2) counter is incremented by the host for each new frame, forming a fragmented message. The acknowledgment (ACK) bit is used by the host to verify the transition of the execution bit to low state (see BALOGH Status Byte, execution bit). The data bit is transitioned high by the host when there are fragmented Write command data frames. The BIDP sends the data bit high when sending Read operation data to the host. The command bit, when set high by the host, tells the BIDP that the frame being sent is a command.

The following is a breakdown of the protocol bits and operation commands. The length of the frame is determined by the configuration selected from the BALOGH GSD file. The examples in this manual represent a 32 byte configuration.

I.0 General Frame:

	MSB 7	6	5	4	3	2	1	LSB 0	
0	Cmd	Data	Command Type			ACK	CH#	Cnt	Protocol Byte & Channel # (0=CH1) (1=CH2)
1	ADDH								MSB Address
2	ADDL or Data								LSB Address or Data
3	LENH or Data								MSB Length or Data
4	LENL or Data								LSB Length or Data
5	•								Data
.	•								Data
31	•								Data

Bits of Protocol Byte:
Bit 7 : Cmd -Command Request (if 1)
Bit 6 : Data -Data Frame (1)
Bit 7 = 1, then bit 6 = 0. If bit 6 = 1, then bit 7 = 0. (Except in Write responses beyond 1st frame)

Bits	5	4	3	Command Type	(Trans1/Trans2 Decimal Value)
	0	0	0	NOP	(0/0)
	0	0	1	Write TAG	(136/138)
	0	1	0	Read TAG	(144/146)
	0	1	1	Discontinuous Read (7 zones, 28 bytes Total)	(152/154)
	1	0	0	Fill TAG	(160/162)
	1	0	1	Reset	(168/170)
	1	1	0	Discontinuous Write (3 zones, 18 bytes Total)	(176/178)
	1	1	1	Auto/Manual Transceiver Communications Mode Request (Cmd=1) End of Data Frames if Data Frame (Data=1)	(184/186)

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

I.1 Host/Master: Frame Idle

	MSB 7	6	5	4	3	2	1	LSB 0
0	0	0	0	0	0	0	0	0
1	0							
2	0							
.	.							
31	0							

I.2 BIDP/Slave: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
0	0	0	0	0	0	0	0	0	
1	0								
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
.	.								
.	.								
31	0								

BALOGH Status Byte:

MSB **7**	**6**	**5**	**4**	**3**	**2**	**1**	LSB **0**
EXE Bit	Low Battery	TAG Pre	Error Bit	Error Code	Error Code	Error Code	Error Code

Bit 7) EXE Bit = Command Execution Status (1=Command Complete) (0=Command In Progress)
Bit 6) Low Batt = (0=Battery OK) (1=Low Battery) (1= Manual Communications Mode if no TAG Present)
Bit 5) TAG Pre = TAG Presence (0=No TAG Present) (1=TAG Present)
Bit 4) Error Bit = (0=No Error) (1=Error, See Error Code)
Bits 3,2,1,0) Error Code :

0001 = Invalid Length Error
0010 = PIC Watchdog Error
0011 = PIC Reset Error
0101 = PIC Dialogue Error
1100 = Transceiver Error
1110 = TAG Memory Fault
1111 = TAG Dialogue Error

II.0 Write TAG Operation

The Write TAG command allows the user to Write data to the TAG in Block Format. This gives the user flexibility to write from 1 byte up to 8K bytes of data, if using an 8K TAG. The amount of data each data frame can contain will vary, depending on the user configuration that is setup for the unit using the BALOGH GSD file. A TAG must be present in the Transceiver zone when a Write command is issued. If no TAG is present, an error code will appear in the Status Byte for that channel in the BIDP response. If more than one data frame is required to Write to the TAG, the subsequent data frames data bit in the Protocol Byte must be transitioned high. The last data frame of a multiple frame Write must have bits #3, #4, & #5 of the Protocol Byte transitioned high signifying last frame of data. The BIDP will respond with an echo of each command frame received. This verifies to the host that the BIDP received the command. Each response from the BIDP contains the current status of both channels on the BIDP. Each Status Byte provides important diagnostic information and should be monitored by the host.

II.1 Host/Master: Write TAG Command

	MSB 7	6	5	4	3	2	1	LSB 0	
	[cmd]	**[data]**	**[command type]**			**[ack]**	**[ch#]**	**[cnt]**	(136) (138)
0	1	0	0*	0*	1*	0	Ch#	cnt	* =1 If last Frame & CH# (0=CH 1) (1=CH 2)
1	ADDH								TAG Address High Byte
2	ADDL								TAG Address Low Byte
3	LENH								Data Length High Byte
4	LENL								Data Length Low Byte
5	Data #1								1st Byte of Data
6	Data #2								2nd Byte of Data
.	.								Bytes 7-26 of Data
31	Data #27								27th Byte of Data (Data length will depend on configuration)

II.2 BIDP/Slave: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
0	1	0	0*	0*	1*	0	CH#	cnt	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								ProfiBus Error Code; 0 if OK
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
4	not used								
31	not used								

II.3 Host/Master: Write TAG (frame with data to Write, if more than one data frame)

MSB LSB

[cmd] [data] [command type] [ack] [ch#] [cnt]

	7	6	5	4	3	2	1	0	
0	1	1	0*	0*	1*	1	CH#	1	* =1 If Last Frame & CH#
1	Data Length								Data Length
2	Data #28								28th Byte of Data
3	Data #n+1								29th Byte of Data
.	.								Bytes 30-56 of Data
31	Data #n+30								57th Byte of Data (Data length will depend on configuration)

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame, forming a fragmented message).

*** When host is sending multiple frames of data to Write, on the last data frame sent to the BIDP, the host must have bits 5, 4, & 3 high indicating last frame of data.**

II.4 BIDP/Slave: Response Subsequent Frames (if more than one data frame)

MSB LSB

	7	6	5	4	3	2	1	0	
0	1	1	0*	0*	1*	1	CH#	1	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								0 if ACK, ProfiBus Error if NACK
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
4	not used								
31	not used								

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

II.5 Host: Response (last frame)

MSB LSB

[cmd]	[data]	[command type]			[ack]	[ch#]	[cnt]
7	6	5	4	3	2	1	0
0	1	1	1	1	1	CH#	0
ProfiBus Error Code							
not used							
not used							

(if more than 1 frame of data, bit 6=1, bit 7=0)
0 if ACK of ProfiBus Error if NACK

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame, forming a fragmented message).

BALOGH Status Byte:

MSB LSB

7	6	5	4	3	2	1	0
EXE Bit	Low Battery	TAG Pre	Error Bit	Error Code	Error Code	Error Code	Error Code

Bit 7) EXE Bit = Command Execution Status (1=Command Complete) (0=Command In Progress)
Bit 6) Low Batt = (0=Battery OK) (1=Low Battery) (1= Manual Communications Mode if no TAG Present)
Bit 5) TAG Pre = TAG Presence (0=No TAG Present) (1=TAG Present)
Bit 4) Error Bit = (0=No Error) (1=Error, See Error Code)
Bits 3,2,1,0) Error Code :

0001 = Invalid Length Error
0010 = PIC Watchdog Error
0011 = PIC Reset Error
0101 = PIC Dialogue Error
1100 = Transceiver Error
1110 = TAG Memory Fault
1111 = TAG Dialogue Error

III.0 Read TAG Operation

The Read TAG command allows the user to Read data from the TAG in Block Format (up to 8K when using an 8K Read/Write TAG). When the BIDP receives a Read TAG command, a TAG must be present in the Transceiver zone. If no TAG is present, an error code will appear in the Status Byte for that channel in the BIDP response. If a TAG is present, the BIDP will execute the command. Data will not be sent back to the host until the BIDP has completed the Read of the TAG. When the BIDP has completed the Read, it will immediately start sending data to the host. The host does not have to send another command requesting data. The host will respond to each data frame sent by the BIDP and increment the modulus counter. The BIDP will continue to send the previous data frame, and not send the next frame until the BIDP receives positive confirmation from the host. Each data frame from the BIDP contains the current status of both channels on the BIDP. Each Status Byte provides important diagnostic information and should be monitored by the host.

III.1 Host/Master: Read TAG Command

	MSB [cmd] 7	[data] 6	[command type] 5	4	3	[ack] 2	[ch#] 1	LSB [cnt] 0	(144) (146)
0	1	0	0	1	0	0	CH#	cnt	Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	TAG ADDH								TAG Address High Byte
2	TAG ADD L								TAG Address Low Byte
3	Byte LENH								Data Length High Byte
4	Byte LENL								Data Length Low Byte
.	not used								
31	not used								

III.2 BIDP/Slave: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
0	1	0	0*	1*	0*	0	CH#	cnt	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								0 if ACK, or ProfiBus Error if NACK
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
4	not used								
31	not used								

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

III.3 Host: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
	[cmd]	**[data]**	**[command type]**			**[ack]**	**[Ch#]**	**[cnt]**	
0	1	0	0	1	0	1	CH#	1	(if more than 1 frame of data, bit 6=1, bit 7=0)
1	ProfiBus Error Code								0 if ACK or ProfiBus Error if NACK
2	not used								
3-31	not used								

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

III.3a BIDP/Slave: Positive Response (first data frame)

	MSB 7	6	5	4	3	2	1	LSB 0	
0	0	1	0*	1*	0*	0	Ch#	cnt	* =1 If Last Frame & CH# (0=CH 1) (1=CH 2)
1	Nr of bytes								Nb of valid Data Bytes
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
4	Data								1st Data Byte
.	.								Bytes 2-27 of Data
31	Data								28th Data Byte (Data length will depend on configuration)

III.3b Host/Master: Response Confirmation

	MSB [cmd] 7	[data] 6	[command type] 5	4	3	[ack] 2	[ch#] 1	LSB [cnt] 0	
0	0	1	0	1*	0	1	CH#	0	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								0 if ACK, ProfiBus Error if NACK
2	not used								
3	not used								
31	not used								

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

III.3c BIDP/Slave: Positive Response (subsequent data frames)

	MSB 7	6	5	4	3	2	1	LSB 0	
0	0	1	0*	1*	0*	ACK	CH#	cnt	* =1 If Last Frame (Cntr must be incremented) & CH#
1	Nr of Bytes								Nb of valid Data Bytes
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
4	Data								29th Data Byte
.	.								Bytes 30-55 of Data
31	Data								56th Data Byte (Data length will depend on configuration)

III.3d Host/Master: Positive Response Confirmation (last frame)

	MSB [cmd] 7	6 [data]	5 [command type]	4	3	2 [ack]	1 [ch#]	LSB 0 [cnt]	
0	0	1	1	1	1	ACK	CH#	x	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								0 if ACK, ProfiBus Error Code if NACK
2	not used								
3	not used								
31	not used								

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

BALOGH Status Byte:

MSB 7	6	5	4	3	2	1	LSB 0
EXE Bit	Low Battery	TAG Pre	Error Bit	Error Code	Error Code	Error Code	Error Code

Bit 7) EXE Bit = Command Execution Status (1=Command Complete) (0=Command In Progress)
Bit 6) Low Batt = (0=Battery OK) (1=Low Battery) (1= Manual Communications Mode if no TAG Present)
Bit 5) TAG Pre = TAG Presence (0=No TAG Present) (1=TAG Present)
Bit 4) Error Bit = (0=No Error) (1=Error, See Error Code)
Bits 3,2,1,0) Error Code :

0001 = Invalid Length Error
0010 = PIC Watchdog Error
0011 = PIC Reset Error
0101 = PIC Dialogue Error
1100 = Transceiver Error
1110 = TAG Memory Fault

IV.0 Discontinuous Read TAG Operation

The Discontinuous Read TAG command allows the user to read up to 7 different memory locations on a TAG. The total number of bytes the user can read is 27 bytes of data. When the BIDP receives the command, a TAG must be present in the Transceiver zone. If no TAG is present, an error code will appear in the Status Byte for that channel in the BIDP response. If a TAG is present, the BIDP will execute the command. Data will not be sent back to the host until the BIDP has completed the Read of the TAG. This command uses one data frame to send the command and the BIDP sends the data to the host in one data frame. The BIDP will continue to send the data frame until the BIDP receives positive confirmation from the host. Each data frame from the BIDP contains the current status of both channels on the BIDP. Each Status Byte provides important diagnostic information and should be monitored by the host.

IV.1 Host/Master: Discontinuous Read TAG Command

	MSB [cmd] 7	[data] 6	[command type] 5	4	3	[ack] 2	[ch#] 1	LSB [cnt] 0	(152) (154)
0	1	0	0	1	1	0	CH#	cnt	Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	1st TAG ADDH								1st TAG Address High Byte
2	1st TAG ADD L								1st TAG Address Low Byte
3	1st Byte LENH								1st Data Length Byte High
4	1st Byte LENL								1st Data Length Byte Low
5	2nd TAG ADDH								2nd TAG Address Byte High
6	2nd TAG ADDL								2nd TAG Address Byte Low
7	2nd Byte LENH								2nd Data Length Byte High
8	2nd Byte LENL								2nd Data Length Byte Low
9	3rd TAG ADDH								3rd TAG Address High Byte
10	3rd TAG ADDL								3rd TAG Address Low Byte
11	3rd Byte LENH								3rd Data Length Byte High
12	3rd Byte LENL								3rd Data Length Byte Low
13	4th TAG ADDH								4th TAG Address Byte High
14	4th TAG ADDL								4th TAG Address Byte Low
15	4th Byte LENH								4th Data Length Byte High
16	4th Byte LENL								4th Data Length Byte Low
17	5th TAG ADDH								5th TAG Address Byte High
18	5th TAG ADDL								5th TAG Address Byte Low
19	5th Byte LENH								5th Data Length Byte High
20	5th Byte LENL								5th Data Length Byte Low
21	6th TAG ADDH								6th TAG Address High Byte
22	6th TAG ADDL								6th TAG Address Low Byte
23	6th Byte LENH								6th Data Length Byte High
24	6th Byte LENL								6th Data Length Byte Low
25	7th TAG ADDH								7th TAG Address Byte High
26	7th TAG ADDL								7th TAG Address Byte Low
27	7th Byte LENH								7th Data Length Byte High
28	7th Byte LENL								7th Data Length Byte Low
.	not used								
31	not used								

Note: The host sends the value 0 in the Length Byte High and Length Byte Low to signal end of discontinuous zones if less than 7 zones are used.

IV.2 BIDP/Slave: Positive Response (data frame)

	MSB 7	6	5	4	3	2	1	LSB 0	
0	0	1	1	1	1	0	CH#	cnt	CH# (0=CH 1) (1=CH 2) & Only Data Frame
1	Nr of Bytes								Nb of valid Data Bytes
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
4	1st Data Byte								1st Data Byte
5	2nd Data Byte								2nd Data Byte
6	3rd Data Byte								3rd Data Byte
.	.								Bytes 4-27 of Data
.	.								
.	.								
31	Data								28th Data Byte

IV.3 Host/Master: Positive Response Confirmation

	MSB **[cmd]** 7	**[data]** 6	**[command type]** 5	4	3	**[ack]** 2	**[ch#]** 1	LSB **[cnt]** 0	
0	0	1	1	1	1	1	CH#	x	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								0 if ACK, ProfiBus Error Code if NACK
2	not used								
3	not used								
31	not used								

ProfiBus Error Code:
0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

BALOGH Status Byte:

MSB **7**	**6**	**5**	**4**	**3**	**2**	**1**	LSB **0**
EXE Bit	Low Battery	TAG Pre	Error Bit	Error Code	Error Code	Error Code	Error Code

Bit 7) EXE Bit = Command Execution Status (1=Command Complete) (0=Command In Progress)
Bit 6) Low Batt = (0=Battery OK) (1=Low Battery) (1= Manual Communications Mode if no TAG Present)
Bit 5) TAG Pre = TAG Presence (0=No TAG Present) (1=TAG Present)
Bit 4) Error Bit = (0=No Error) (1=Error, See Error Code)
Bits 3,2,1,0) Error Code :

0001 = Invalid Length Error
0010 = PIC Watchdog Error
0011 = PIC Reset Error
0101 = PIC Dialogue Error
1100 = Transceiver Error
1110 = TAG Memory Fault

V.0 Fill TAG Operation

The Fill TAG command provides the user with the ability to write the same value to the TAG with a single command (up to 8K bytes). Each data frame from the BIDP contains the current status of both channels on the BIDP. Each Status Byte provides important diagnostic information and should be monitored by the host.

V.1 Host/Master: Fill TAG Command

	MSB [cmd] 7	[data] 6	[command type] 5	4	3	[ack] 2	[ch#] 1	LSB [cnt] 0		(160)	(162)
0	1	0	1	0	0	0	CH#	Cnt	Protocol Byte & CH# (0=CH 1) (1=CH 2)		
1	ADDH								TAG Address High Byte		
2	ADDL								TAG Address Low Byte		
3	LENH								Data Length High Byte		
4	LENL								Data Length Low Byte		
5	Data								Data to Fill TAG Bytes With		
6	not used										
31	not used										

V.2 BIDP/Slave: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
0	1	0	1	0	0	0	CH#	cnt	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								ProfiBus Error Code; 0 if OK
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
31	not used								

ProfiBus Error Code:
0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

V.3 Host/Master: Positive Response Confirmation

	MSB [cmd] 7	[data] 6	[command type] 5	4	3	[ack] 2	[ch#] 1	LSB [cnt] 0	
0	1	0	1	0	0	1	CH#	1	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								0 if ACK, ProfiBus Error Code if NACK
2	not used								
3	not used								
31	not used								

ProfiBus Error Code:
0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

BALOGH Status Byte:

MSB 7	6	5	4	3	2	1	LSB 0
EXE Bit	Low Battery	TAG Pre	Error Bit	Error Code	Error Code	Error Code	Error Code

Bit 7) EXE Bit = Command Execution Status (1=Command Complete) (0=Command In Progress)
Bit 6) Low Batt = (0=Battery OK) (1=Low Battery) (1= Manual Communications Mode if no TAG Present)
Bit 5) TAG Pre = TAG Presence (0=No TAG Present) (1=TAG Present)
Bit 4) Error Bit = (0=No Error) (1=Error, See Error Code)
Bits 3,2,1,0) Error Code :

0001 = Invalid Length Error
0010 = PIC Watchdog Error
0011 = PIC Reset Error
0101 = PIC Dialogue Error
1100 = Transceiver Error
1110 = TAG Memory Fault

VI.0 Reset Operation

The Reset command places the BIDP in an idle state and ready to receive commands. Each data frame from the BIDP contains the current status of both channels on the BIDP. Each Status Byte provides important diagnostic information and should be monitored by the host.

VI.1 Host/Master: Reset Command

	MSB [cmd] 7	[data] 6	[command type] 5	4	3	[ack] 2	[ch#] 1	LSB [cnt] 0	(168) (170)
0	1	0	1	0	1	0	CH#	cnt	Protocol Byte & CH# (0=CH 1) (1=CH 2)
1									
2	not used								
31	not used								

VI.2 BIDP/Slave: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
0	1	0	1	0	1	0	CH#	cnt	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								ProfiBus Error Code; 0 if OK
2	BALOGH Status Channel #1								BALOGH Status Channel #1
3	BALOGH Status Channel #2								BALOGH Status Channel #2
31	not used								

ProfiBus Error Code:
0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

VI.3 Host: Response

MSB LSB

[cmd]	**[data]**	**[command type]**			**[ack]**	**[ch#]**	**[cnt]**	
7	6	5	4	3	2	1	0	
1	0	1	0	1	1	Ch#	1	Echo of Protocol Byte w/ ack and cnt set high
ProfiBus Error Code								0 if ACK or ProfiBus Error if NACK
not used								
not used								

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

VII.0 Discontinuous Write TAG

The Discontinuous Write TAG command allows the user to write up to 3 different memory locations on a TAG. The total number of bytes the user can write is 18 bytes of data. When the BIDP receives the command, a TAG must be present in the Transceiver zone. If no TAG is present, an error code will appear in the Status Byte for that channel in the BIDP response. If a TAG is present, the BIDP will execute the command. Each data frame from the BIDP contains the current status of both channels on the BIDP. Each Status Byte provides important diagnostic information and should be monitored by the host.

VII.1 Host/Master: Discontinuous Write TAG Command

	MSB [cmd] 7	[data] 6	[command type] 5	4	3	[ack] 2	[ch#] 1	LSB [cnt] 0	(176) (178)
0	1	0	1	1	0	0	CH#	cnt	Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	1st TAG ADDH								1st TAG Address High Byte
2	1st TAG ADDL								1st TAG Address Low Byte
3	1st Byte LENH								1st Data Length Byte High
4	1st Byte LENL								1st Data Length Byte Low
5	2nd TAG ADDH								2nd TAG Address Byte High
6	2nd TAG ADDL								2nd TAG Address Byte Low
7	2nd Byte LENH								2nd Data Length Byte High
8	2nd Byte LENL								2nd Data Length Byte Low
9	3rd TAG ADDH								3rd TAG Address High Byte
10	3rd TAG ADDL								3rd TAG Address Low Byte
11	3rd Byte LENH								3rd Data Length Byte High
12	3rd Byte LENL								3rd Data Length Byte Low
13	Data								1st Byte Data to Write to TAG
14	Data								2nd Byte Data to Write to TAG
15	•								•
.	•								•
31	Data								18th Byte Data to Write to TAG

VII.2 BIDP/Slave: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
0	1	0	1	1	0	0	CH#	cnt	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								0 if ACK ProfiBus Error if NACK
2	BALOGH Status Channel #1								BALOGH Status for Channel #1
3	BALOGH Status Channel #2								BALOGH Status for Channel #2
31	not used								

ProfiBus Error Code:
0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

VII.3 Host: Response

MSB **[cmd]**	**[data]**	**[command type]**			**[ack]**	**[ch#]**	LSB **[cnt]**	
7	6	5	4	3	2	1	0	
1	0	1	1	0	1	CH#	1	CH#1=0, CH#2=1
ProfiBus Error Code								0 if ACK or ProfiBus Error if NACK
NOT USED								
NOT USED								

ProfiBus Error Code:
0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

VIII.0 Auto/Manual Transceiver Communication

The Auto/Manual Transceiver Communications Mode command places a BIDP Transceiver in an Auto or Manual Communications state. In Auto Mode, all Transceiver channels respond normally to requests and in reply of status.

Manual Mode is an option that is recommended when two Transceivers are placed closer together than the recommended range. This allows the Transceiver to communicate with the TAG, without interference from the other Transceiver.

Transceivers can be placed in Manual Mode in one of two ways. First, by placing DIP switch 8 in the ON position, both Transceivers will default to Manual Mode upon cycling power of the BIDP. The second method is through the issuing of the Manual Mode command. If both Transceivers need to be in Manual Mode, two commands must be sent, one for each channel.

If a Transceiver is placed in Manual Mode, the status for that channel is no longer active (TAG Pre, Error LED, etc.). The BIDP will place a static 192 dec. in the Status Byte for that Transceiver (bit 7 & bit 6 high). Bit 6 of the Status Byte is used to indicate if a channel is in Manual Mode. Status is available during the execution of a command. For example, if the host sends a Write command, the Transceiver becomes active and returns status **while there is a command in progress.** Once the last frame of data has been sent and the command is complete, the Transceiver is disengaged and status returns to a static 192 dec. The Transceiver returns to Manual Mode until the next command is sent from the host, or the command to place Transceivers in Auto Mode is issued.

VIII.1 Host/Master: Auto/Manual Command

	MSB [cmd]	[data]	[command type]			[ack]	[ch#]	LSB [cnt]	
	7	6	5	4	3	2	1	0	(184) (186)
0	1	0	1	1	1	0	CH#	cnt	Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	not used								
2	0=Manual Mode*							255(FF)=Auto Mode**	
31	not used								

*** Will go to Manual Mode (both channels) automatically upon power up of BIDP if switch 8 (on DIP switch bank) is placed ON**

**** Will go to Auto Mode upon power up of BIDP if DIP switch 8 is placed in OFF position**

VIII.2 BIDP/Slave: Response

	MSB 7	6	5	4	3	2	1	LSB 0	
0	1	0	1	1	1	0	CH#	cnt	Echo of Protocol Byte & CH# (0=CH 1) (1=CH 2)
1	ProfiBus Error Code								ProfiBus Error Code; 0 if OK
2	BALOGH Status Channel #1								Normal = Auto Mode Disable = Manual Mode(192)
3	BALOGH Status Channel #2								Normal = Auto Mode Disable = Manual Mode(192)
31	not used								

ProfiBus Error Code:

0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

VIII.3 Host: Response

	MSB [cmd] 7	6	[data] 5	[command type] 4	3	[ack] 2	[ch#] 1	LSB [cnt] 0	
0	1	0	1	1	1	1	CH#	1	CH #1=0, CH #2=1
1	ProfiBus Error Code								0 if ACK or ProfiBus Error if NACK
2	not used								
3	not used								
31	not used								

ProfiBus Error Code:
0001 = Invalid Command Error
0010 = Channel Busy Processing
0011 = Channel has unrecoverable error, unable to respond to request

Important Note:

Bit 2 =	ACK bit	This is the ACK bit used to verify the transition of the execution bit to low state.
Bit 1 =	Channel #	This bit designates the Channel # (0=CH1) (1=CH2).
Bit 0 =	Fragmentation Counter	Frame counter (modulus 2, 0-1) (The host must increment this counter for each new frame forming a fragmented message).

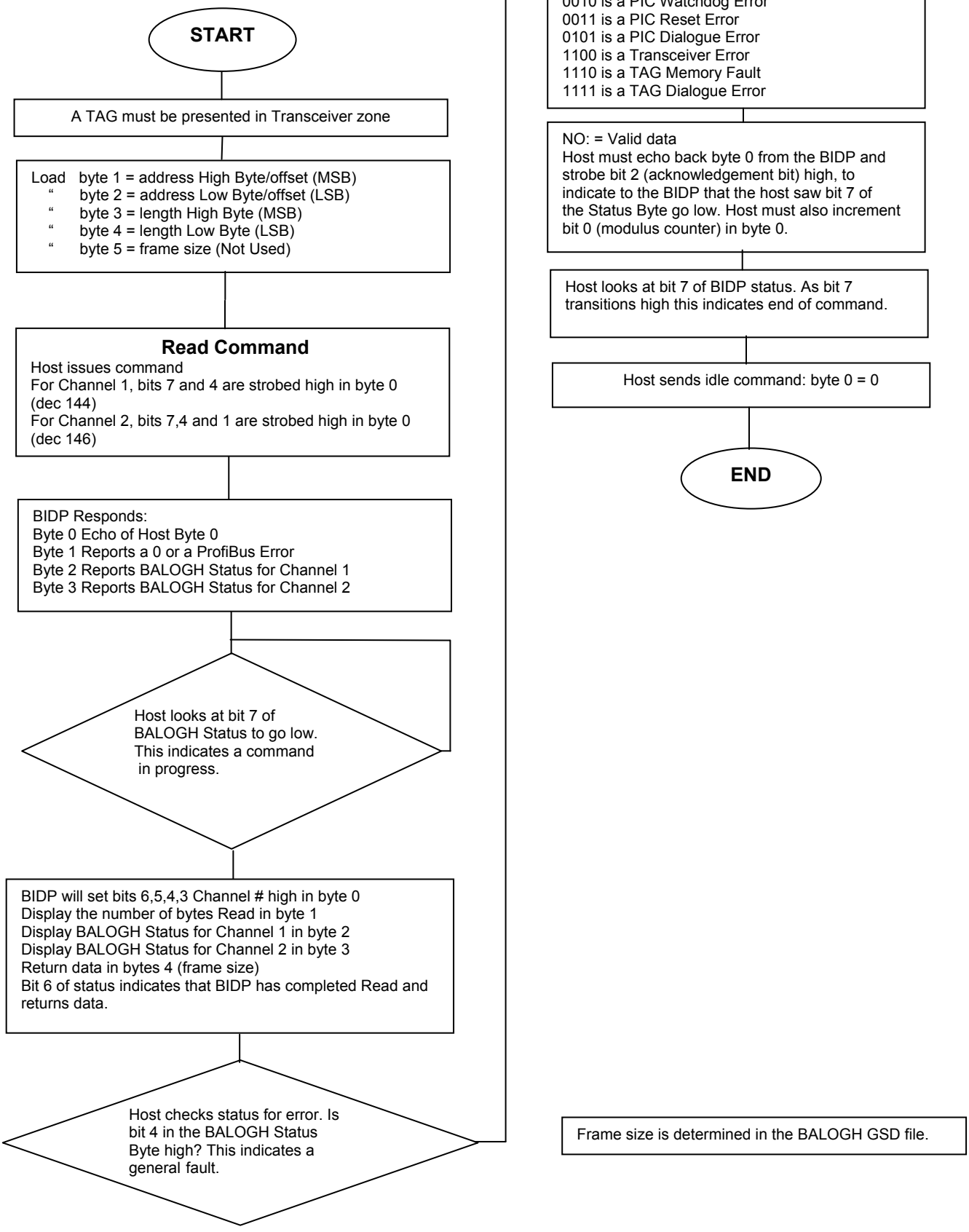
MSB 7	6	5	4	3	2	1	LSB 0
EXE Bit	Low Battery	TAG Pre	Error Bit	Error Code	Error Code	Error Code	Error Code

Bit 7) EXE Bit = Command Execution Status (1=Command Complete) (0=Command In Progress)
Bit 6) Low Batt = (0=Battery OK) (1=Low Battery) (1= Manual Communications Mode if no TAG Present)
Bit 5) TAG Pre = TAG Presence (0=No TAG Present) (1=TAG Present)
Bit 4) Error Bit = (0=No Error) (1=Error, See Error Code)
Bits 3,2,1,0) Error Code :

0001 = Invalid Length Error
0010 = PIC Watchdog Error
0011 = PIC Reset Error
0101 = PIC Dialogue Error
1100 = Transceiver Error
1110 = TAG Memory Fault
1111 = TAG Dialogue Error

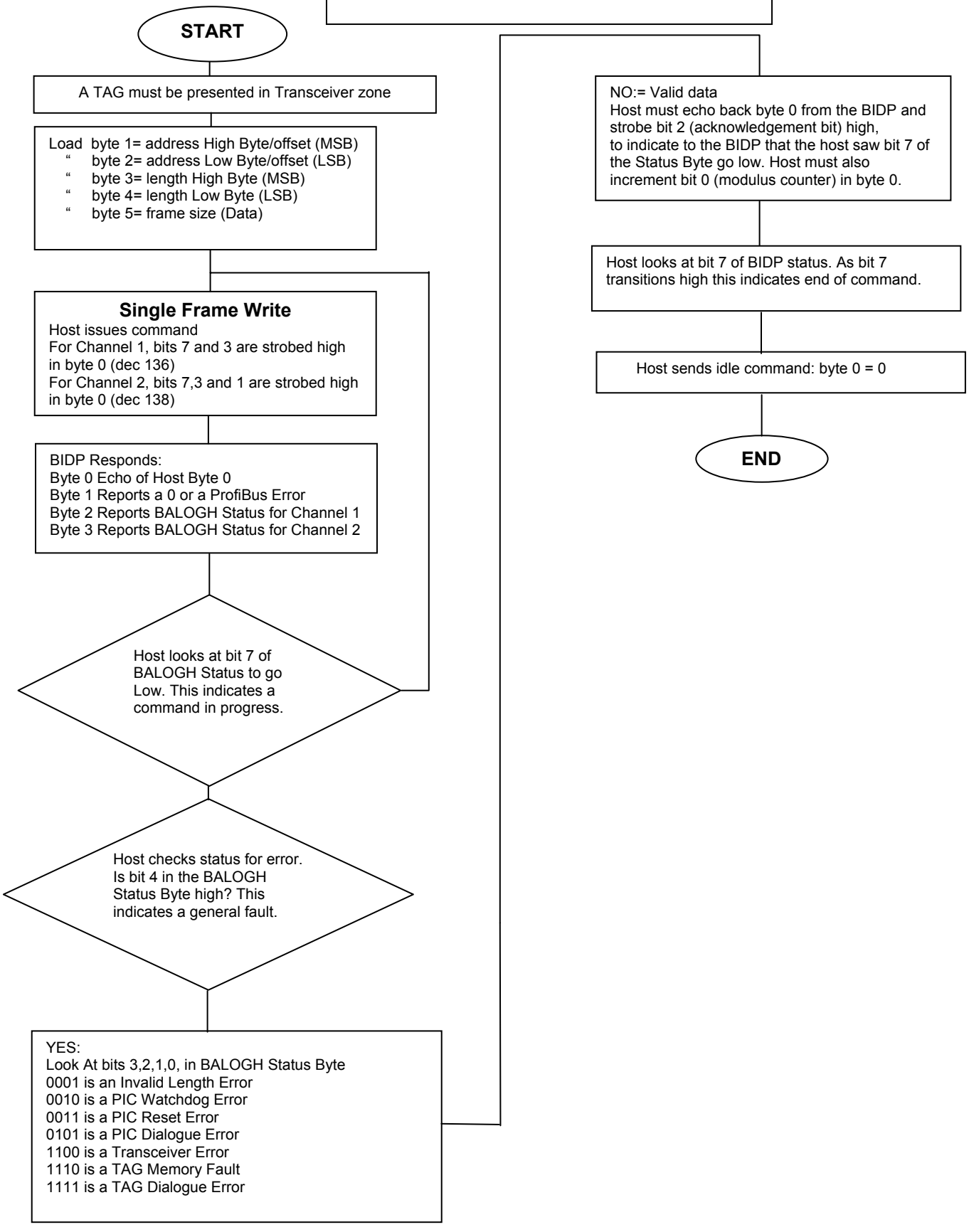
- **Status is disabled in Manual Communications Mode until a command is executing for a channel. TAG Presence is not available when a channel is in Manual Communications Mode. Bit 6 will be high, indicating the channel is in Manual Communications Mode.**

SINGLE FRAME BLOCK READ

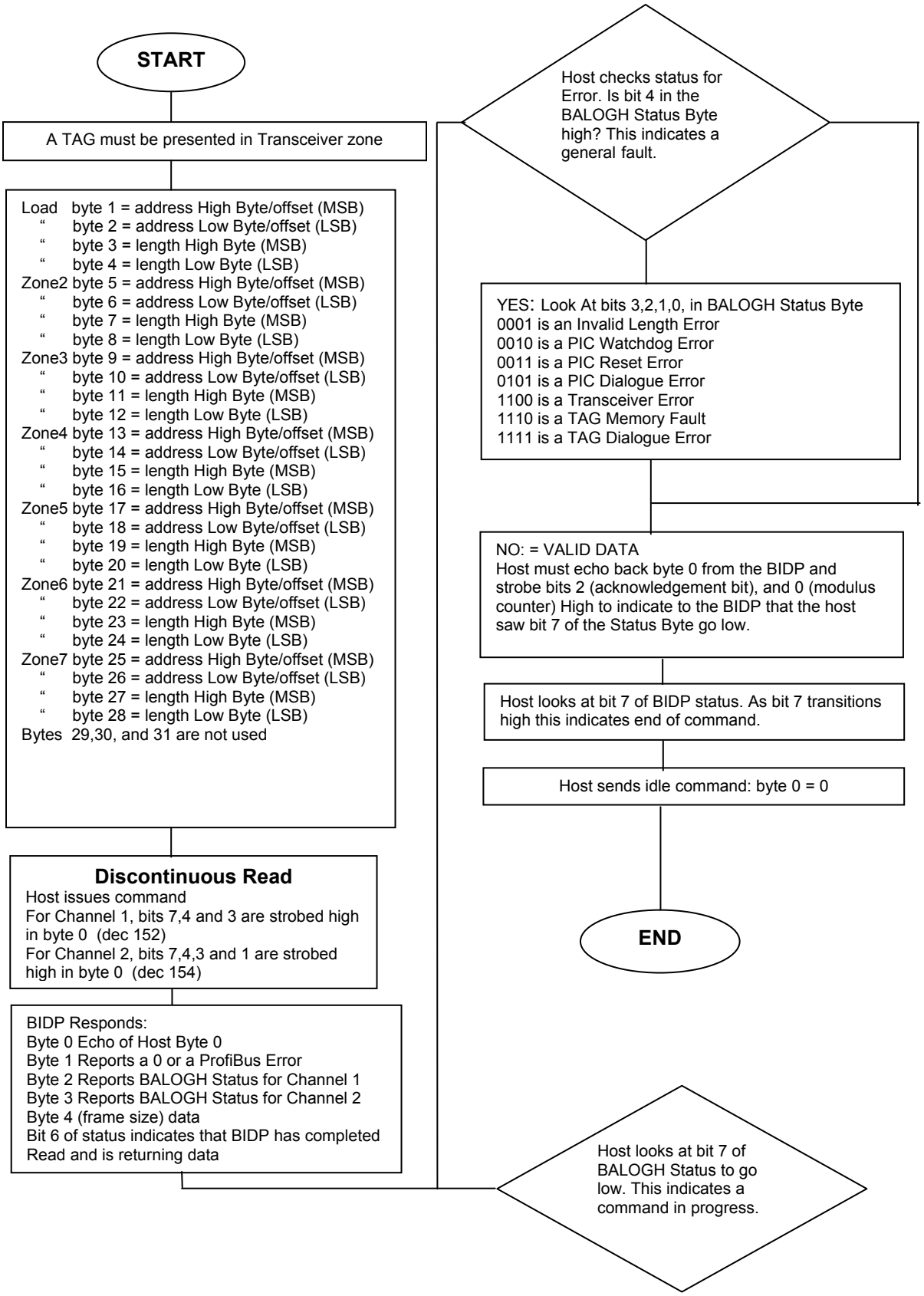


Frame size is determined in the BALOGH GSD file.

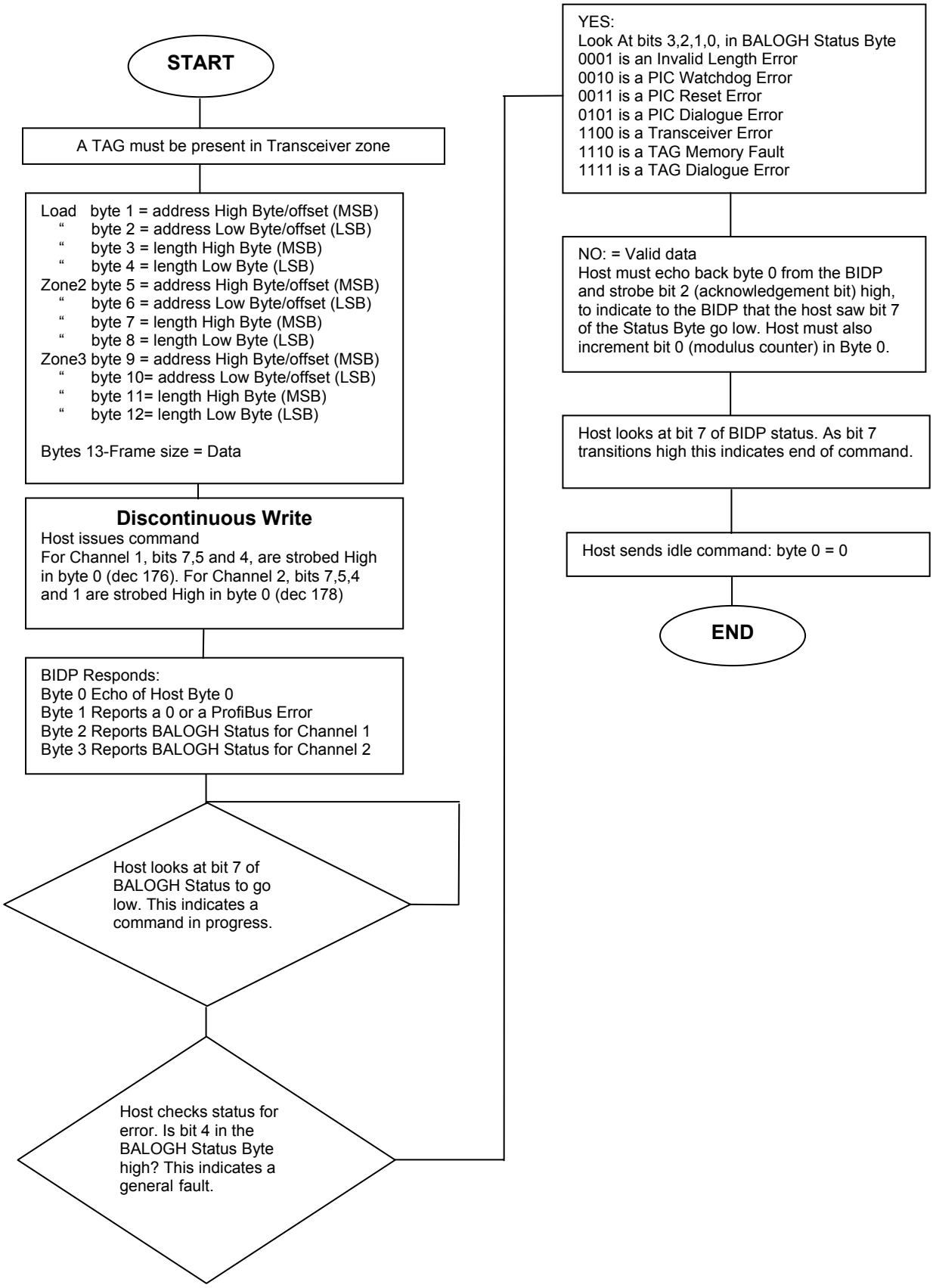
SINGLE FRAME BLOCK WRITE



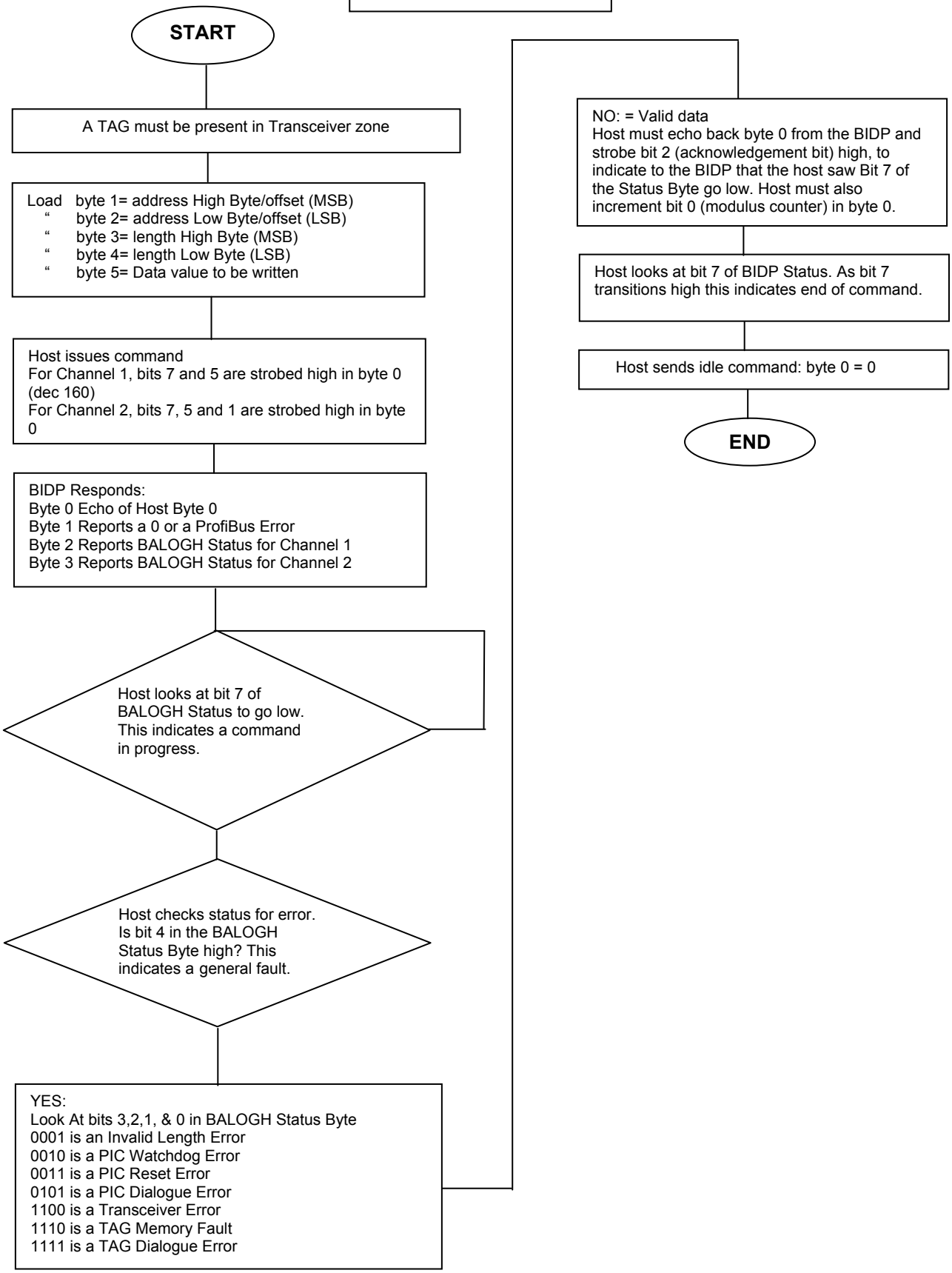
DISCONTINUOUS READ



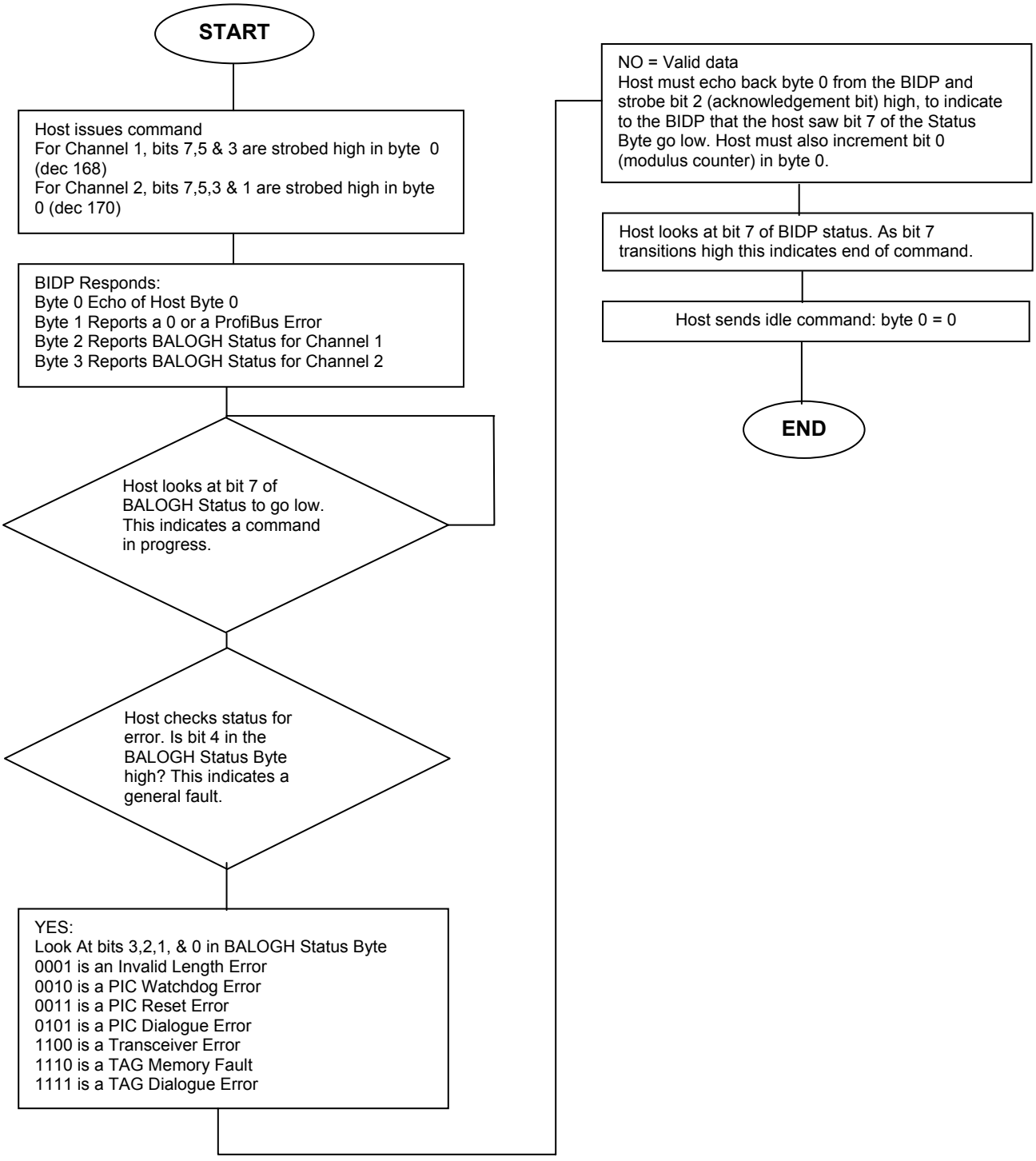
DISCONTINUOUS WRITE



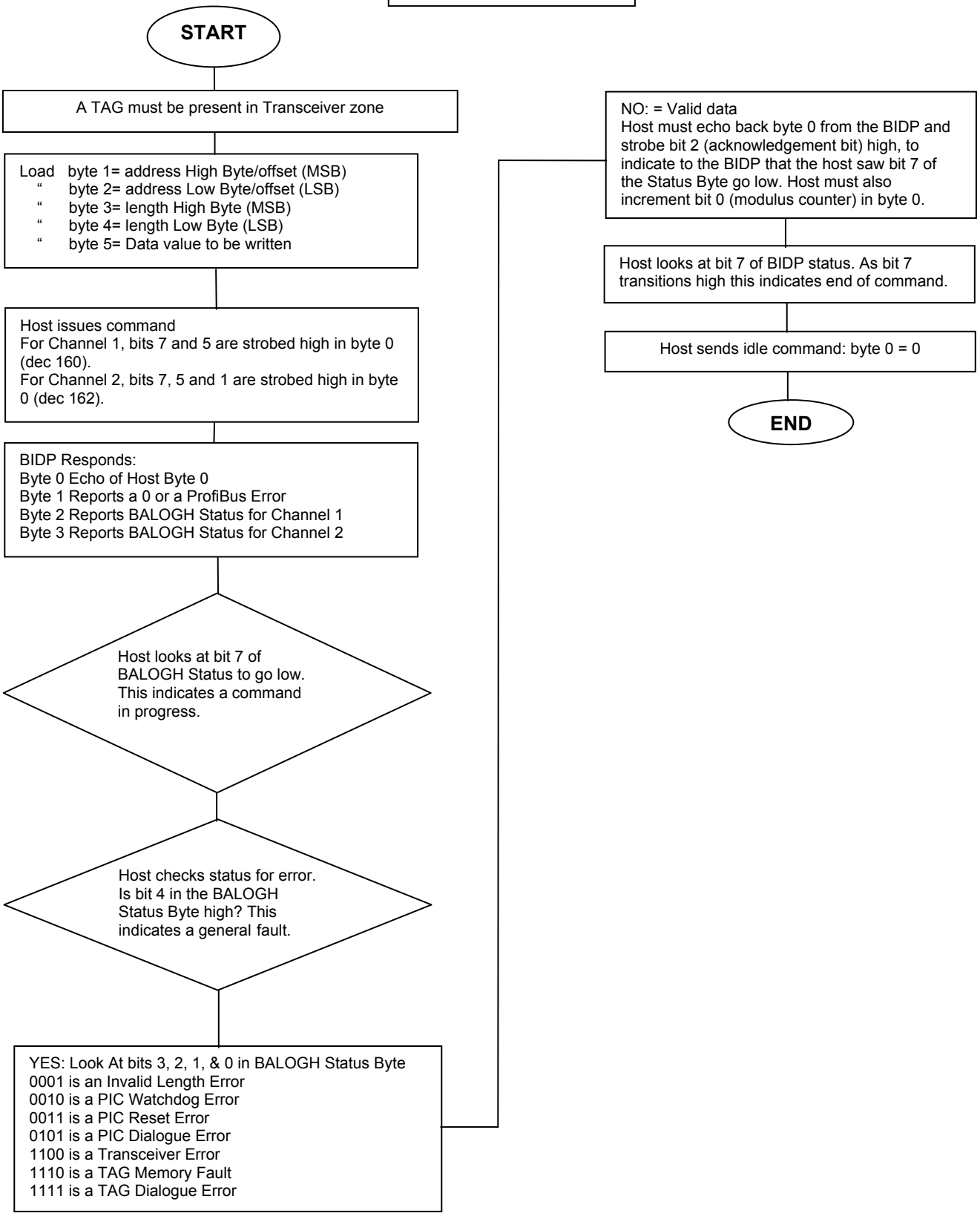
FILL COMMAND



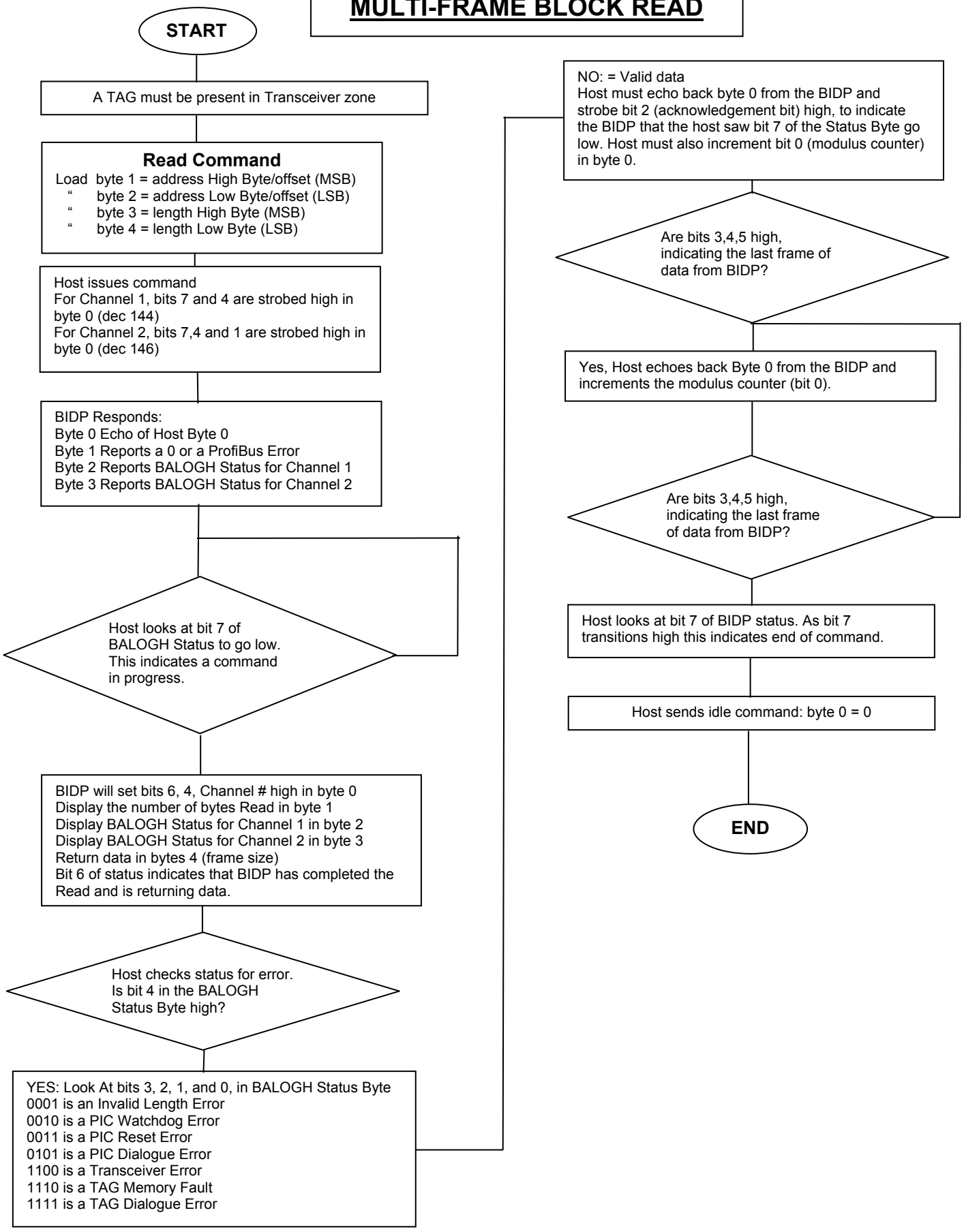
RESET COMMAND



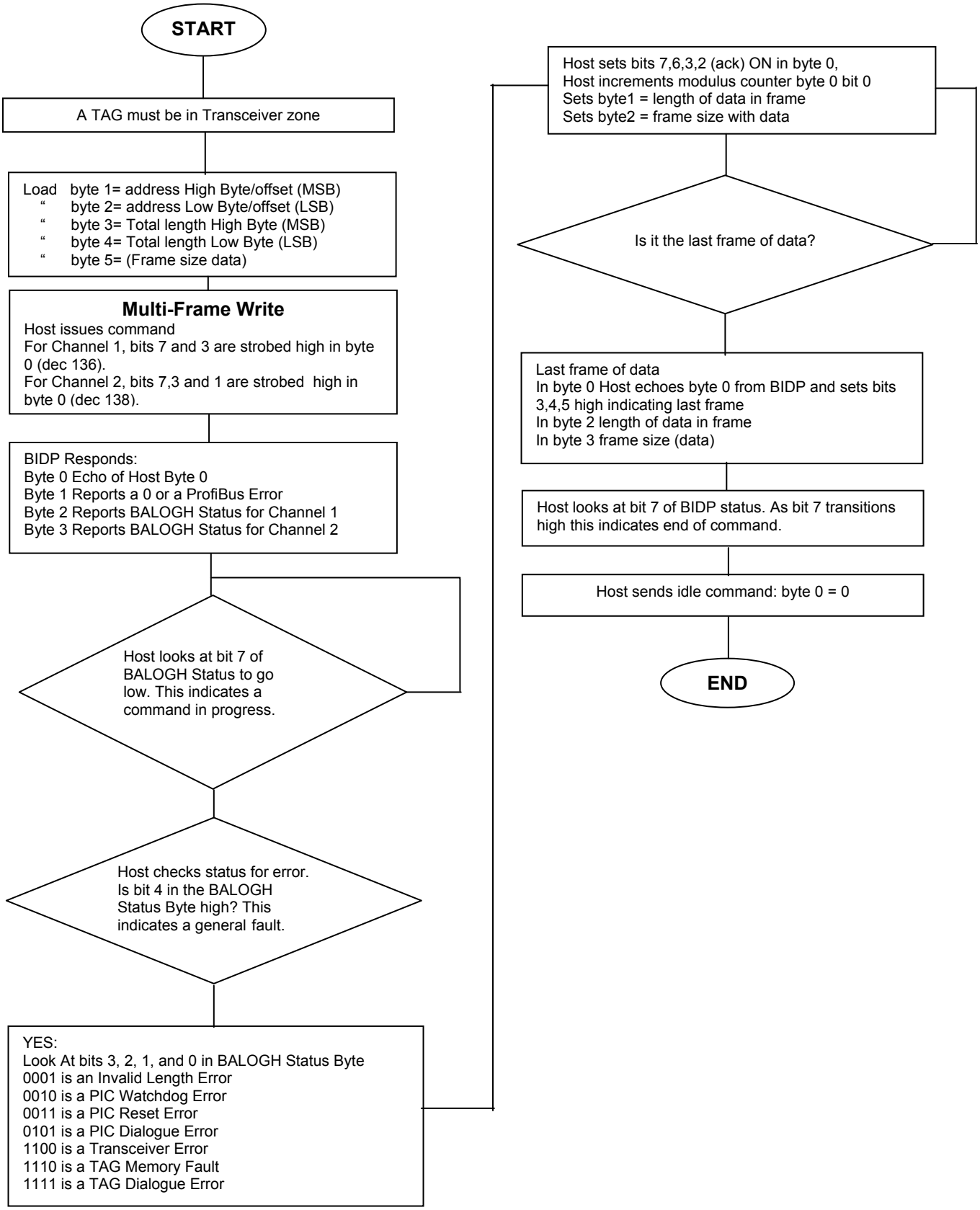
FILL COMMAND



MULTI-FRAME BLOCK READ



MULTI-FRAME BLOCK WRITE



ProfiBus-DP® Control Board

BIDP/**

Identification - Coding

Reference: BIDP/**

A=	OMA	64, 2K, or 8K bytes Read/Write TAG
P=	OP	64 byte & 96 byte Read/Write TAG
X=	OMX	High Speed 8K & 32K byte Read/Write TAG
E=	GIE	512, 2K, 8K byte Read/Write TAG
I =	OIR	64K Byte Read/Write TAG
F=	OF or OFR	7 bytes Read-Only TAG
L=	OL or OLR	2 byte extended range Read Only TAG

Characteristics

- The BALOGH BIDP meets the needs required for today's network flexibility. It is also compatible with existing network devices such as I/O, push button, motion controls, motor controls, motor starters, photo cells, limit switches, etc.
- Multi-Drop capability: Allows a connection scheme of multiple BIDP interface units on a ProfiBus-DP® Network. Each BIDP has dual channel capability. Two Transceivers can be connected to each BIDP. Each functions independently and simultaneously.
- Small footprint provides ease of mounting (202mm x 130mm x 45mm) with an IP-65 rated metallic enclosure and quick connect wiring. It also provides field mounting, durability, and reduces wiring costs.
- Selectable data transfer rates up to 12 mega-baud.
- Bi-Color LED indication for the following: Bus Status, Channel Operation, TAG Presence, Transceiver fault, and 24 VDC Power.
- DIP switch Selectable Node Addressing. Bank of 7 DIP switches located behind cover next to status LED indicators. ProfiBus-DP® allows Node selection from 0 to 125.
- DIP switch 8 selects for Auto and Manual Transceiver Mode Communications.
  - ON = Manual Mode
  - OFF = Auto Mode

Node Addressing

Switch #8 = MSB, Switch #1 = LSB, Down = On, Up = Off

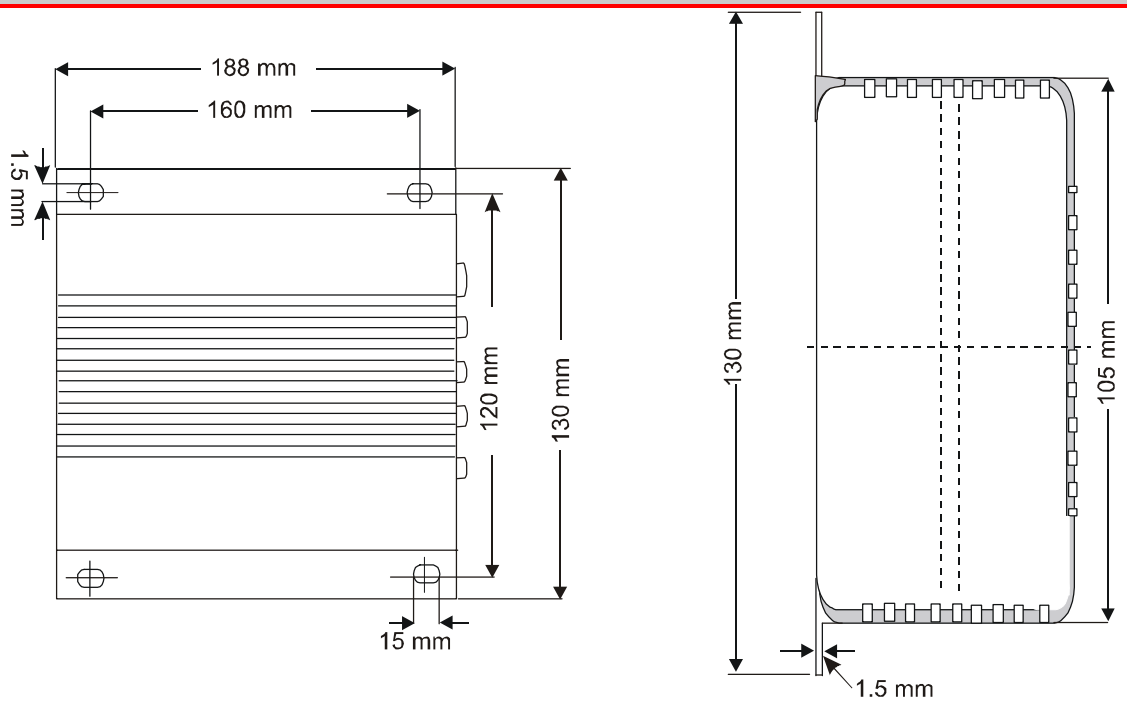
Switches:	MSB	7	6	5	4	3	2	1	LSB
Node ID	0	0	0	0	0	0	0	0	
	1	0	0	0	0	0	0	1	
	2	0	0	0	0	0	1	0	
	*								
	125	1	1	1	1	1	1	0	

Characteristics	Symbol	Unit	BIDP
Supply Power (± 10%)	Ucc	V	24 VDC (ripple <2%)
Consumed Current	Io	mA	50mA (without Transceiver)
Ambient Temperature	T	°C	0 to 50°C
Protection Degree	IP	/	65
Weight	M	G	750 Grams

Revised July 1, 2002

Identification - Coding

Dimensions



Connections