

# **CLC-83 & ERAI-80**

## **POSITION & DIRECTIONAL DETECTION EIGHT BIT DATA INFORMATION OC SERIES TAGS AND CLC-83 PARALLEL CONTROL BOARD WITH ERAI-80 TRANSCEIVER**

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

The BALOGH CLC-83 & ERAI-80 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.

BALOGH makes no representation or warranty, expressed, implied or statutory with respect to, and assumes no responsibility for the accuracy, completeness, or usefulness of the information contained in this manual. No warranties of merchantability or fitness for purpose shall apply.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  
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# 1 INTRODUCTION

BALOGH READ-Only systems are simple and economical solutions to your identification needs. With BALOGH READ-Only systems, the TAG is read without contact, up to 200mm, and is **100%** reliable, even under the harshest industrial conditions including electromagnetic interference, metal chips, grease, paint, moisture, concrete, etc....

BALOGH TAGS are passive, meaning that no power source in the TAG is necessary when the data is exchanged. Data is transmitted by the TAG when it enters the electromagnetic field generated by a BALOGH Transceiver.

## SPECIAL APPLICATIONS:

The BALOGH READ-Only systems are uniquely suited for many tracking applications because they are modular by design. This modularity allows BALOGH to add some unique tracking capabilities to the OC series of 8 bit fixed code TAGS. When an OC style tag is used in conjunction with the CLC-83 fixed code Control Board and the ERAI-80 direction sensing Transceiver, the OC style TAG will provide a fixed 8 bit code and the TAGS location with respect to the ERAI-80 (TAG left of center, TAG right of center, TAG centered). This arrangement has found applications in areas such as:

- Automatic storage and retrieval of products in warehousing.
- Tracking location and direction of automated rail carts.
- Marking locations for smart vehicles (AGV's & ASRS) as they move through mines, factories, or warehouses.

# 2 CODING READ-ONLY TAGS

The OC Series TAGS carry an eight bit code and can be coded BY THE USER. In order to code the TAG, open the chamber that houses the 8 straps. By cutting or not cutting the straps, a binary value of 0 to 255 is assigned to the TAG. Cutting a strap will signify a "0", while leaving it uncut will signify a "1". The least significant bit will be indicated by a dot of paint inside the coding chamber.



## **3 CLC-83 AND ERAI-80 DIRECTIONAL TRANSCIEVER**

The CLC-83 is an 8-Bit parallel Control Board that provides, on its parallel outputs, the code contained in the OC Series READ-Only TAG. The CLC-83 also provides directional information when used with the ERAI-80 directional sensing Transceiver.

### **3.1 ADVANTAGES**

- Direction detection in relation to an axis.
- Three position detection: Left, Right, Center.
- Two discrete outputs on the ERAI-80 for remote directional data.
- Automatic data bus updating.
- Multiplexable 8 - bit Data Bus.
- Data output bus is latched until a new TAG arrives.
- Absolute data verification by discrete output.
- Independent TAG present discrete output.

### **3.2 TRANSCIEVERS**

It is the Transceiver that provides the energy for data transmission and reception between the TAG and Transceiver. An electromagnetic field generated by the Transceiver determines the dimensions of the transmission zone. As a TAG enters the transmission zone data transfer takes place.

## 4 OPERATION OF THE CLC-83 BOARD INPUT/OUTPUT COMMAND DEFINITIONS

The CLC-83 Control Board is connected to the host controller via 24 volt DC parallel I/O. The CLC-83 acts as the interface between the ERAI-80 and the hosts logic device. The reading of the TAG and acquisition directional data takes place as follows.

### **BOARD PROGRAMMING:**

The CLC-83 receives on its LEC input terminal a strobe from the user's logic device. This strobe signal will reset the CLC-83's data output bus and READ validation output line. The CLC-83 is now prepared to read a TAG. The presence of a TAG is not necessary in order to program the board.

### **TAG READING:**

The TAG will be read as it enters into the transmission zone of the Transceiver, directional data will also be presented on the discrete outputs available on the CLC-83 and the ERAI-80. Upon the successful completion of the read operation the read validation signal will transition high, data can now be read from the CLC-83's output bus.

### **4.1 SBA INPUT COMMAND**

**SBA:** This Input allows the 8-Bit Data Output Bus of two or more CLC-83 Control Boards to share the same Input Bus located at the Host Controller.

SBA = 1 The Control Board inputs and outputs are active and accessible.

SBA = 0 The data outputs are disabled (high impedance state). The LEC input is disabled.  
The status and directional outputs remain active.

### **4.2 LEC INPUT COMMAND**

**LEC:** This input will initialize the board, setting all outputs to zero.

Switching LEC from logic 0 to logic 1 will:

Change VAL to logic 0

Change Output Bus to logic 0

LEC at logic 1:

Holds VAL at logic 0

Holds Output Bus at logic 0

Restricts reading of OC TAG

Directional outputs remain active

PRE (TAG Present) remains active

Switching LEC from logic 1 to logic 0 will:

Enable READING of OC TAG

### 4.3 VAL STATUS OUTPUT

**VAL:** The VAL output indicates the status of a READ operation.

VAL = 0 READING has not yet occurred or not yet validated.

VAL = 1 READ operation valid.

### 4.4 PRE STATUS OUTPUT

**PRE:** This output indicates the presence of a TAG in the Transmission Zone of the Transceiver.

PRE = 1 Presence of OC TAG.

PRE = 0 No TAG present.

### 4.5 OUTPUT BUS (BUS 0)

These outputs represent the code read from the OC Series TAG. This data is latched until LEC changes to logic 1 or a new TAG, with a different code, appears in the Transceivers Transmission Zone.

### 4.6 POSITIONING OUTPUTS

**LEFT DETECT OUTPUT:** This output will transition high when an OC style TAG approaches the ERAI-80's Left Detection zone. This output will automatically transition low when the TAG leaves the "Zone".

**RIGHT DETECT OUTPUT:** This output will transition high when an OC style TAG approaches the ERAI-80's Right Detection zone. This output will automatically transition low when the TAG leaves the Transceiver Transmission Zone.

**CENTER DETECT:** Center detection is indicated by both Left Detect and Right Detect remaining high.



## 5 PROGRAMMING OF A READ OPERATION (OC SERIES)

LEC switched from logic 0 to logic 1:

- Changes VAL to logic 0
- Changes Output Bus to logic 0
- Restricts READING of OC TAG

LEC switched from logic 1 to logic 0:

- Enables READING of OC TAG

**NOTE:** This operation does not require the presence of a TAG.

If the LEC input is not used:

The CLC-83 will automatically read the next OC Series TAG that appears in the Transceivers Transmission Zone and update its outputs. The new data is latched on the Output Bus until a new TAG appears.

### 5.1 READING STAGE

As soon as a TAG enters the Transceiver's Transmission Zone, the Control Board will respond with the following signals:

PRE = 0 switches to logic 1.

BUS = 0 code appears on Bus 0.

VAL = 0 switches to logic 1 indicating valid data is on Bus 0.

### 5.2 BOARD STATUS AFTER EXECUTION OF A READ OPERATION

- The data read from the OC TAG is stored in memory and latched on BUS 0.

## **6 ERAI-80 TRANSCEIVER**

The ERAI-80 Transceiver is designed to operate exclusively with the CLC-83 Control Board. This Transceiver can read all BALOGH OC Series READ-Only TAGS and provides status of the TAG'S position.

### **6.1 ERAI-80 CHARACTERISTICS:**

- Four pin connector for communicating TAG data to the CLC-83.
- Three pin connector to provide local TAG position via 24 volt DC discrete parallel outputs.
- Right Detect indication LED.
- Left Detect indication LED.
- Two potentiometers to adjust center detection tolerance.

## 6.2 TUNING THE ERAI-80

To achieve the tightest center-sensing window at a fixed distance the potentiometers should be adjusted as follows:

Set both potentiometers completely counter clockwise.

Clear the CLC-83 Data Output Bus by strobing the LEC Input high to low.

Place an OC style TAG (at a fixed distance\*) over the center of the ERAI-80 with the arrow on the TAG laying parallel to the arrow on the ERAI-80.

Slowly adjust one potentiometer clockwise until its associated LED turns on and the corresponding CLC-83 directional output transitions high.

Repeat the above step on the remaining potentiometer.

Turn the TAG 180 degrees and again position the TAG in the center of the ERAI-80 at the same fixed distance.

Verify that both LED's on the ERAI-80 are still on.

If not, adjust the associated potentiometer until its corresponding LED and CLC-83 directional outputs are again HIGH.

The adjustment is complete.

**NOTE:** Turning each potentiometer farther clockwise by an equal amount can widen the center-sensing window.

\* Fix the distance between the TAG and the transceiver no greater than the recommended distance (Sr) given in the ERAI-80 data sheet. Typically this fixed distance will be the intended range for use in the actual operation.

# 7 CONNECTING A CLC-83 CONTROL BOARD

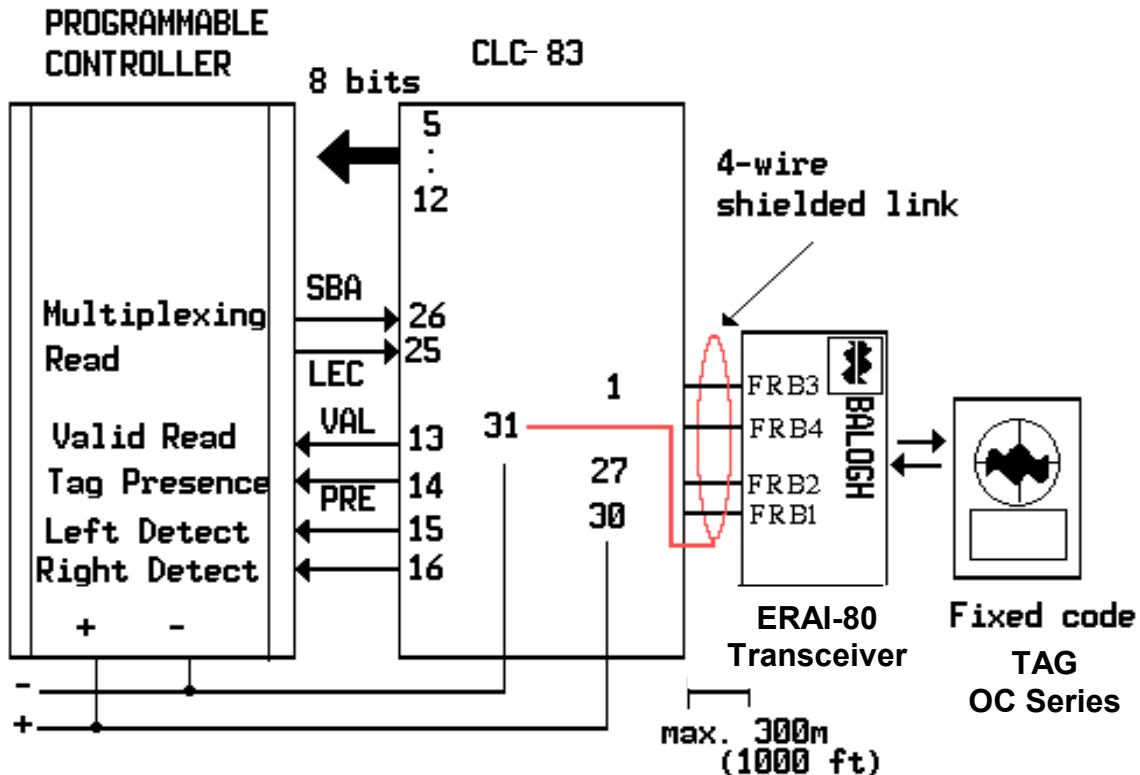
**POWER SUPPLY:** Positive DC rail 24 volt max (V)  
DC Ground (0)

**BOARD INPUTS:** Board Serial Input <---- Trans. Serial Output (FRB2)  
SBA: Multiplexing Input  
LEC: Read request Input

**BOARD OUTPUTS:** Board Serial Output ----> Trans. Serial Input (FRB3)  
PRE: TAG presence  
VAL O: Read validation  
BUS O: Parallel Outputs O0 to O7 (7 = MSB)  
LO: Left Detect  
RO: Right Detect

The CLC-83 has the same wiring features as the CLC-81 with these exceptions:

**BOARD OUTPUTS:**  
LEFT: Left Position Detection  
RIGHT: Right Position Detection  
CENTER: Both Left and Right Outputs will be High



## 8 MULTIPLEXING

### MULTIPLEXING THE CLC-83

This option allows the user to connect several CLC-83 Control Boards to common I/O in the hosts' logic unit. In this configuration the, SBA input is set to logic 1 to select the CLC-83 Control Board that is targeted for data retrieval or reprogramming; all other Control Boards will have their associated SBA inputs at logic 0.

Multiplexable I/O;

BUS O, 8 bit data output bus.

LEC, read programming input line.

Non-multiplexable I/O;

LO, left detect output

RO, right detect output

PRE, TAG present output

VAL, valid read output

SBA, board select input

SBA at logic 1 enables any TAG read data to be presented on the data output bus and allows the LEC input to be acknowledged by the CLC-83.

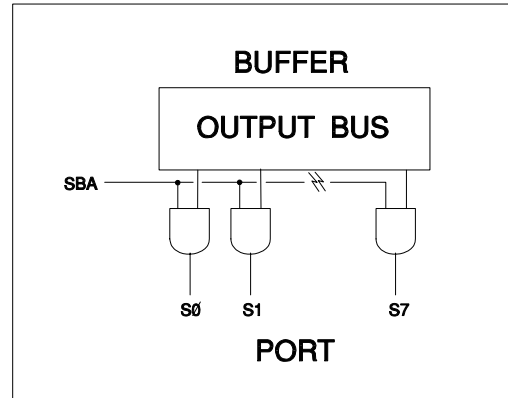
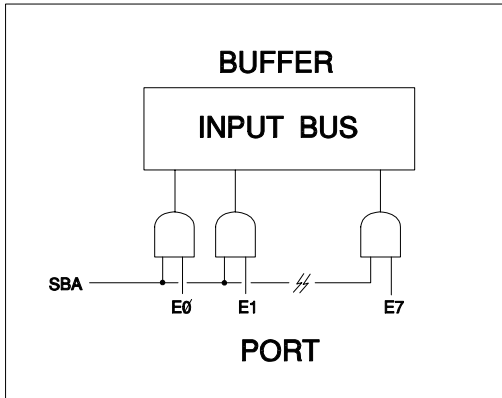
SBA at logic 0 disables the 8 bit data output bus and the LEC input will have no effect on the CLC-83 control board.

### 8.1 ON-THE-FLY READING

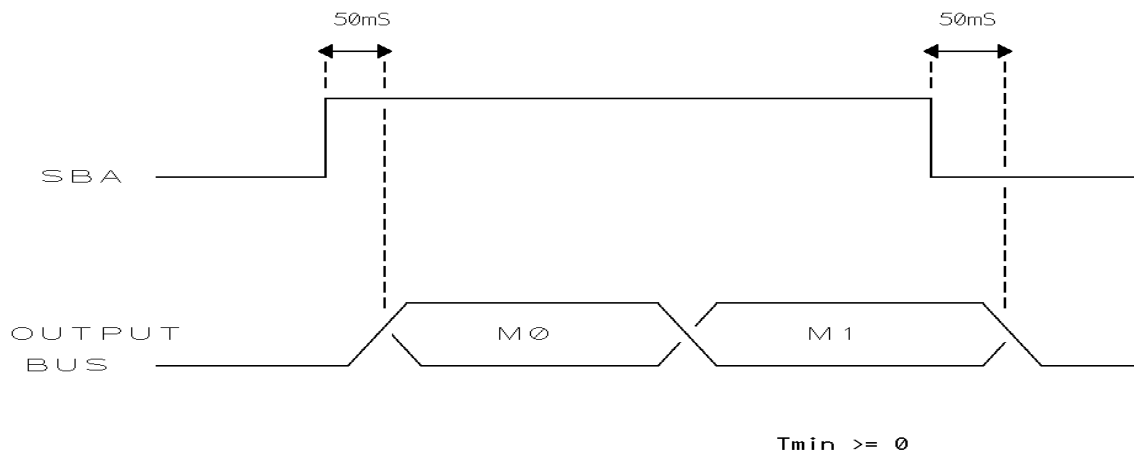
This operation poses no particular problem when multiplexing since the board's memory allows retention of the code read without requiring the presence of the TAG.

Once the read function has been performed, the board switches its VAL output to logic 1. The code is stored in memory and the user can access it upon demand.

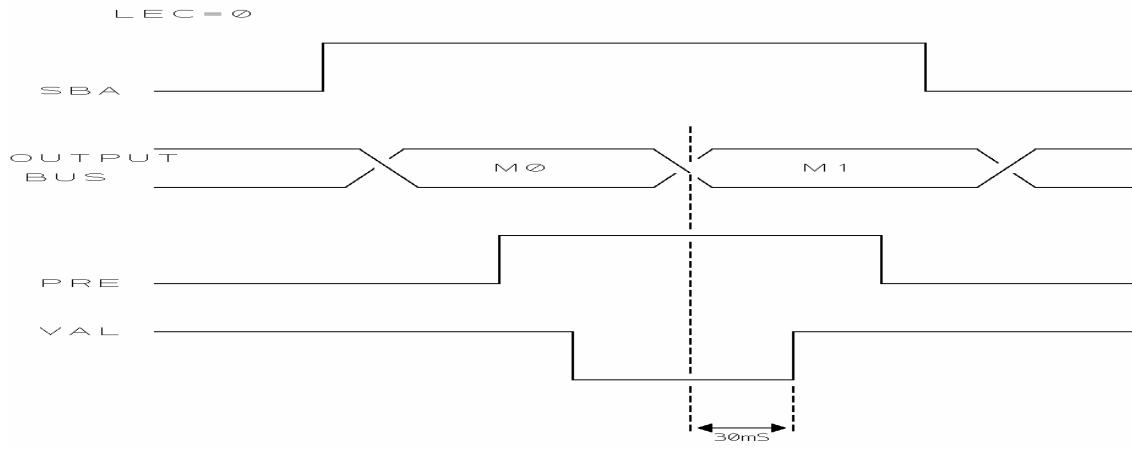
# PRINCIPLE EFFECT OF THE SBA SIGNAL



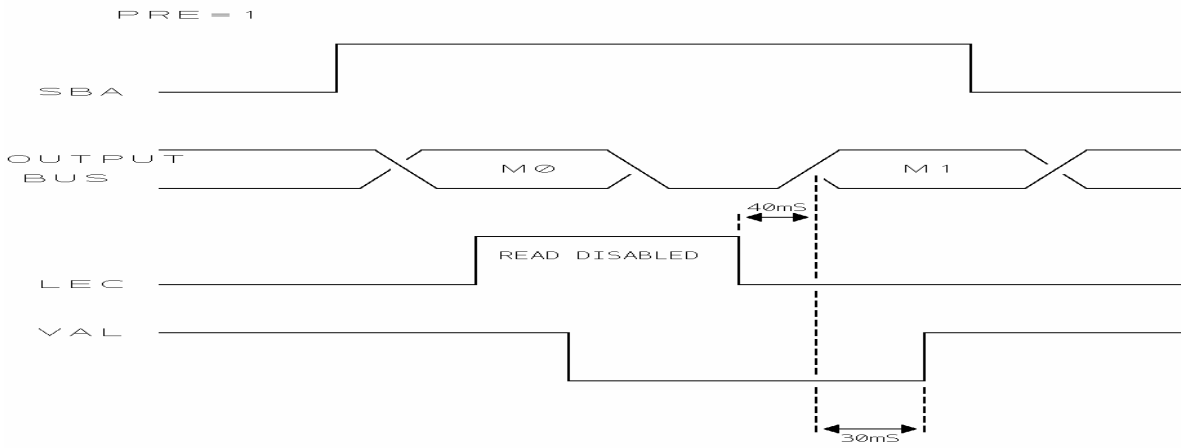
## DATA BUS OUTPUT RESPONSE TIME WHEN MULTIPLEXING



## TIMING DIAGRAM AUTOMATIC READ MODE



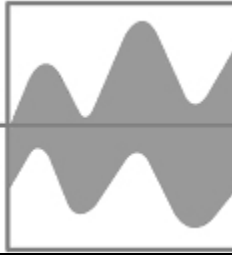
## TIMING DIAGRAM STROBED READ MODE







# BALOGH



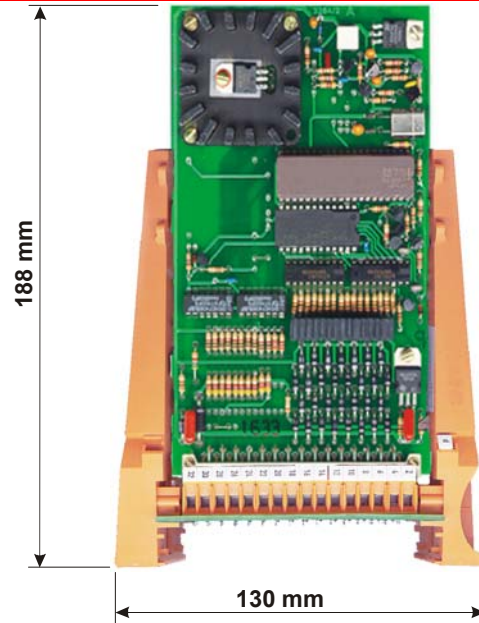
## CLC-83 Control Board

### Identification - Coding

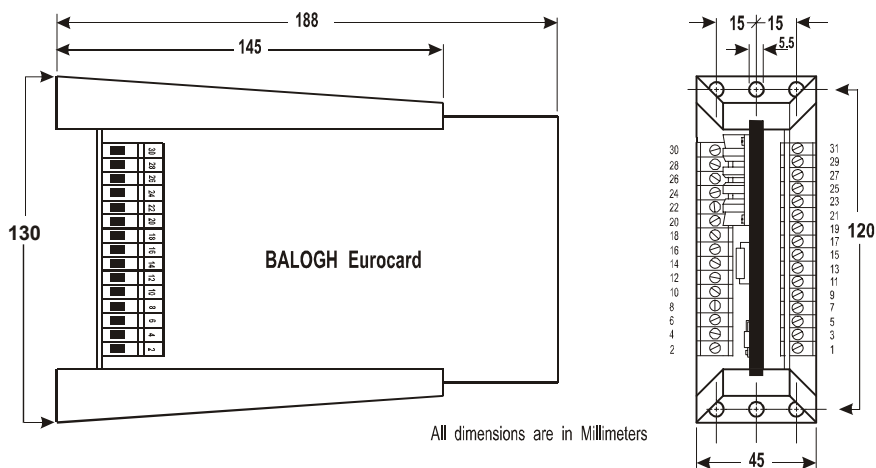
Reference: CLC-83

#### Characteristics

- Parallel Control Card, Eurocard Format (100 x 160mm)
- Multiplexable parallel connection
- Allows Reading of type "OC" Read Only TAGS.
- Each Control Board must be connected to a BALOGH Transceiver in order to Read data from the TAGS.
- When used in conjunction with an ERAI-80 Transceiver, provides Data, Directional, and Positioning information.
- Requires GC-01 Board Holder



#### Dimensions



Characteristics at 25° C	Symbol	Unit	CLC-83
V Supply (< 2% Ripple)	Vcc	V DC	24
Voltage Tolerance			-10% to +10%
Current Consumption	Im	mA	150
Serial Connection			No
No. of Parallel Inputs			2
Input Impedance	Ze	K ohm	10
Input Logic 0		V	0 to 10
Input Logic 1		V	15 to Vcc
No. of Parallel Outputs			12
MAX Continuous Current (per Output)	Is	mA	100
MAX Voltage Drop across an Output	Vdrop	V	1.5
Output Logic 0		V	0
Output Logic 1		V	Vcc – 1.5
MIN Ambient TEMP	Tmin	°C	0
MAX Ambient TEMP	Tmax	°C	+70
Protection Degree	IP		00
Weight	M	g	300
MAX Cable Length Between Control Board and Transceiver			1000 ft
MAX Cable Length Between Control Board and Buffer			
Short Circuit Protected			
Protected against Inverse Polarity			Yes

The letters indicating ‘EOSV’ are located inside the Transceiver’s connection chamber or on the chamber’s cap.

Terminal	Locations	ERAI-80
1	Transceiver Output Connected to	FRB 3
2		
3		
4		
5	Bit 7 Output (MSB)	
6	Bit 6 Output	
7	Bit 5 Output	
8	Bit 4 Output	
9	Bit 3 Output	
10	Bit 2 Output	
11	Bit 1 Output	
12	Bit 0 Output (LSB)	
13	VAL Output	
14	PRE Output	
15	Left Output (LO)	
16	Right Output (RO)	
17		
18		
19		
20		
21		
22		
23		
24		
25	LEC Input	
26	SBA Input (Multiplex Line)	
27	Transceiver Input Connected to	FRB 2
28		
29		
30	+24 VDC to Board & Transceiver	FRB 1
31	Ground	FRB 4



# BALOGH



## Transceiver ERAI-80

### Identification Systems

#### Description

The ERAI-80 Transceiver is used with a BALOGH CLC-83 Control Board to read Fixed Code “OC” Series TAGS. It also gives the position of a TAG in relation to an axis with three positions of detection (left, right, and centered.) Using the outputs it is also possible to use the CLC-83 and ERAI-80 to determine direction of travel.

- Right Detect indication LED.
- Left Detect indication LED.
- Two potentiometers to adjust center detection tolerance.

**Dimensions:**  
**235 mm**  
 x  
**80 mm**  
 x  
**40 mm**



#### Connections

Connection is made between a BALOGH Control Board and Transceiver with a four conductor twin-shielded cable with wiring connections as follows:

##### 3 Pin Male Connector

Terminal	Meaning
1	Left
2	Ground
3	Right

##### 4 Pin Male Connector

Terminal	Meaning
1	+Vcc
2	Output
3	Input
4	Ground

Please consult the Assembly Manual for mounting/positioning recommendations or call BALOGH for further help.

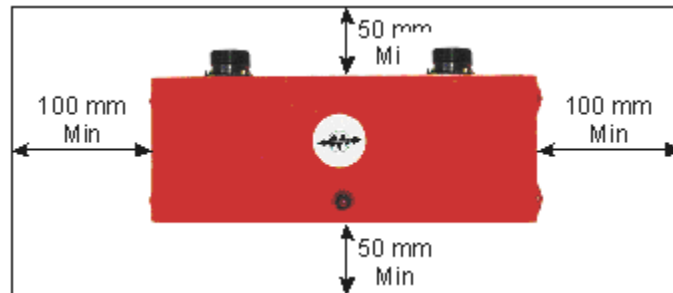
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# Transmitting Characteristics

				OC-56	OC-93	OC-85					
Maximum Range		H	mm	65	60	65					
Static Transmission Zone	Typ. Height at Sr	Sr	mm	26	24	26					
	Typ. Length at Sr	L	mm	180	160	180					
	Typ. Width at Sr	I	mm								
Dynamic Transmission Zone	Minimum Length at Sr	LSr	mm								
	Maximum Lateral Offset	DSr	mm	16	16	16					
	Maximum Angular Offset	<°	°	20							

Characteristics at 25° C	Symbol	Unit	
Power Supply (<10% ripple)	Ual	V DC	24
Voltage Tolerance	Dual		
Max Current Consumption	Im	mA	150
Min Ambient Temperature	Tmin	C°	-25
Max Ambient Temperature	Tmax	C°	+70
Distance Between Transceivers	Der	mm	400
Protection Degree	IP		65
Weight	M	g	700
Casing			Rilsan

The Transceiver is not to be mounted in a recessed metal cavity. A minimum metal free clearance surrounding the Transceiver is required.



To avoid interference between two Transceivers, there must be a minimum space between them.

