▶*Trio Motion Technology*◀

Application Note

Doc No.:	**TN20-18**
Version:	**1.0**
Date:	**21 October 1997**
Subject:	**Fibre Optic Network - Floating Point format**

Introduction.

When using the Fibre Optic Network, it can sometimes be seen that there are what appear to be small rounding errors in the floating point variables when they are transferred from one MC2 to another. This application note describes the two number formats used in the data transfer so that the user can appreciate the circumstances in which numeric errors will occur.

MC2 Floating Point Format

The MC2 uses a 32 bit format. 8 bits are the exponent, 23 bits are the mantissa leaving one bit for the sign.

EXPONENT	S	MANTISSA
(8 Bits)	1	(23 Bits)

Fibre Optic Network

The network uses a different format to that described above in order to maintain compatibility with the earlier generation of controllers such as the MC1 and EURO1.

A 64 bit format is used where the upper 32 bits contain the Integer part and the lower 32 bits the Fractional part.

INTEGER	FRACTION
(32 Bits)	(32 Bits)

Compatibility Issues

It will be apparent that any number which requires more than 24 bits to represent the actual digits will suffer some losses as they are converted from the 64 bit format. For example the following errors may occur when conversion to 24 + 8 bit format takes place.

Network SEND instruction	Value Received
SEND(10,1,0,-65536)	-65535.9961
SEND(10,1,0,-16777215)	-16777214.0000
SEND(10,1,0,-10001.0001)	-10000.9990