Figure 11-8—RTD Input Module Block Diagram

The fault LED denotes the status of the module processor, and will be off during normal operation. If the fault LED is on or is blinking, and cycling power to the module does not change it, then the I/O module should be replaced.

The module address circuit reads the selected module address from the rotary switches on each node. This address should correspond to the address of the I/O module hardware in the application program. If these rotary switches are set incorrectly, the node will not communicate with the LINKnet controller module, and a "no message" fault will be annunciated through the application program. If two nodes are set to the same address, an "address" fault will be annunciated through the application program, and both nodes will not function. If the node address switches are changed, power to the module must be cycled before it will read the new module address and change its communication accordingly.

A "type" fault is annunciated through the application program when the wrong module type is installed at a given address. For example, installing a thermocouple module in place of an RTD module generates a type fault. If an output node receives data intended for a different module type, it will not update its outputs, and will set them to the "off" state when its watchdog timer times out.

No message faults, address faults, and type faults are non-latching. When these faults occur for an input module, the application program will give default values for each channel.

Troubleshooting Flowchart

If a problem occurs with the LINKnet network, use Figure 11-25 (Troubleshooting Flowchart) as a guide to find and repair the problem.

11.7—LINKnet 6Ch T/C Module

11.7.1—Module Description

The LINKnet 6Ch T/C Module connects to six Type J or K thermocouples. The thermocouple type is selected in the application program. There is a fail high and a fail low version of the module, which allow the input channels to be pulled high or low on an open input. See Appendix A for desired part numbers. The modules have an AD592 ambient temperature sensor mounted on them for cold junction temperature sensing. The cold junction compensation is performed in software. The module has a built-in reference voltage that is used to verify proper operation of the A/D converter. Appropriate faults are annunciated through the application program. Up to 60 nodes or LINKnet I/O modules can be connected to each channel of the LINKnet Controller Module.
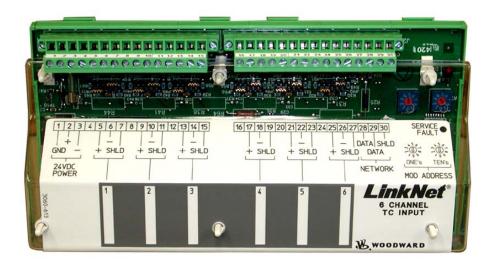

Figure 11-9—LINKnet 6Ch T/C Module

11.7.2—Module Specification

Table 11-5. LINKnet 6Ch T/C Module Specification

Number of Inputs: 6 internal +1 cold junction

Note: Type J and K thermocouples must conform to the common commercial specifications published in the Annual Book of ASTM Standards with voltage predictions in line with N.I.S.T. Monograph 175 or ITS-90.

Open thermocouple detection:	Fail Low and Fail High depending on P/N
Cold Junction:	AD590
Resolution:	12 bits
Temp Coefficient (ppm/ C):	235
Accuracy:	1% at 25 °C (factory calibrated)
Input Impedance:	2.0 MΩ
Power Supply Input:	18 to 32 Vdc
Power Required:	2.4 W at 24 Vdc

11.7.3—Isolation

Table 11-6. LINKnet 6Ch T/C Module Isolation

Network to I/O channel:	277 Vac
Power supply input to network:	277 Vac
I/O channel to I/O channel:	0 V
PS input to I/O channel:	500 Vdc
Field Wiring:	14 AWG maximum wire size
Ambient Temperature Range:	–40 to +55 °C

11.7.4—Shock and Vibration

Mil-Std-810, 30 G's sine wave at 11 ms
Mil-Std-167, 18-50 Hz

11.7.5—EMC

Emissions:	EN 61000-6-4
Immunity:	EN 61000-6-2

11.7.6—Installation

Install the LINKnet 6CH TC Module on the DIN rail and connect to the appropriate LINKnet network and 24 Vdc power. Wire the thermocouple connection per Figure 11-10. Set module address one's and ten's rotary switches per application setup.

The LINKnet system accommodates hot-replacement of faulty nodes. When replacing a node, the network cable connections must remain intact. A faulty node can be removed from the network by pulling both terminal blocks out of their headers, and removing the node from the DIN rail. The address switches of the replacement node should be set to match those of the faulty node. The replacement node can then be mounted on to the DIN rail, and the terminal blocks pushed into the headers. It is then necessary to reset the node through the application program to reinitiate communications with the LINKnet controller module and to clear the "no message" fault.
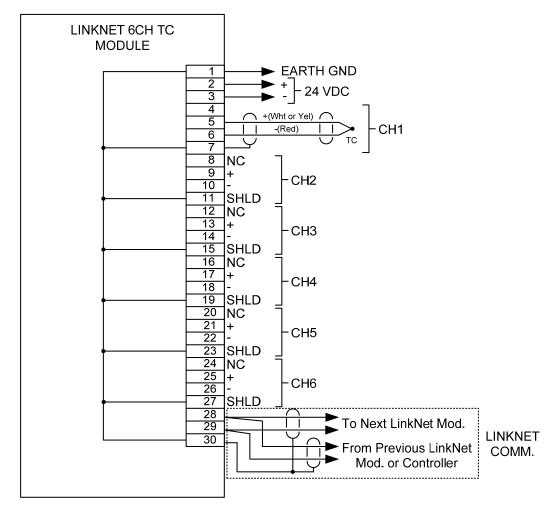
Figure 11-10—LINKnet 6CH TC Module Wiring

11.7.7—Troubleshooting

The module receives information from thermocouples, which can be either J or K type. The type is selected in the application program. It also has an AD592 ambient temperature sensor mounted on the module for cold junction temperature sensing. The cold junction compensation is performed in software. There is a fail high and a fail low version of the module, selected by jumpers on the board, which allow the input channels to be pulled high or low on an open input. Each input is multiplexed to a voltage-to-frequency converter. The module processor reads the period of this signal and converts it to a count, which it transmits through the transceiver to the LINKnet controller module. See Figure 11-11 for block diagram of the thermocouple input module.

Part No	Status	Description	Extended Description	CSA	UL	ATEX	CE (LVD)	CE (EMC)	ABS	DNV	LRS
9905-968	A	MODULE	LINKNET 6 CHANNEL 4-20 MA IN		x	x	n/a	x	x	x	x
9905-969	A	MODULE	LINKNET 6 CHANNEL 4-20 MA IN W/ 24 V		x	x	n/a	x	x	x	x
9905-970	A	MODULE	LINKNET 6 CHANNEL 100 OHM RTD		x	x	n/a	x	x	x	x
9905-971	A	MODULE	LINKNET DISCRETE IN		x	x	n/a	x	x	x	x
9905-972	A	MODULE	LINKNET 6 CHANNEL 4-20 MA OUT		x	x	n/a	x	x	x	x
9905-973	A	MODULE	LINKNET DISCRETE OUT		x	x	n/a	x	x	x	x
9907-072	A	Power Supply	SGL Out 18-32 VDC NetCon	x			x	x	x	x	x
9907-073	A	Power Supply	Multi Out 18-32 VDC NetCon	x			x	x	x	x	x
9907-074	A	Power Supply	SGL Out 42-60 VDC NetCon	x			x	x	x	x	x
9907-075	A	Power Supply	Multi Out 42-60 VDC NetCon	x			x	x	x	x	x
9907-076	A	Power Supply	SGL Out 120 VAC/DC NetCon	x			x	x	x	x	x
9907-077	A	Power Supply	Multi Out 120 VAC/DC NetCon	x			x	x	x	x	x
9907-078	A	Power Supply	SGL Out 220 VAC/DC NetCon	x			x	x	x	x	x
9907-079	A	Power Supply	Multi Out 220 VAC/DC NetCon	x			x	x	x	x	x
9907-205	A	Programmer	Hand Held, CE Compliant, 4 Piece Kit				x	x	x		

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Status	Definition
A	Active
ANP	Active, Non-preferred
AS	Active Service
INA	Inactive