

ASTRA

IDEC Device Driver
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⌘ Tables of Contents ⌘

Preface	3
1. Introduction	3
2. Technical and Communication Details	4
3. Data Types and Addressing	5
4. Optimisations	7
5. Errors	7

⌘ Preface ⌘

This document introduces you to the device driver for **IDEC** plc Micro_1/Micro_3. It contains technical information about **IDEC** device driver. This document gives you Protocol information about **IDEC** device driver.

⌘ Introduction ⌘

The intent of this document is to assist users of **IDEC** PLCs in conjunction with the Astra MMI software package. A general knowledge of the Protocol for **IDEC** PLC family is assumed. The addressing scheme is that of the programming software with some modifications which are explained. Description of the different data types and the addressing scheme should be understood before attempting to use the driver in a Astra project.

The driver is intended to be used only on one PC serial port at a time.

The optimization features described in this document can improve performance, but they are not essential for use.

⌘ Technical & Communication Details ⌘

PLC Make :	IDEC
PLC Modles :	IDEC Micro-1, IDEC Micro-3
PLC Memory :	BYTE Memory.
Communication Protocol :	IDEC (supports multidrop)
Communication Parameters :	
Baud Rate -	9600
Parity -	EVEN
Data Bits -	7 (for model Micro-3) 8 (for model Micro-1)
Stop Bits -	1
Cable Connections :	It requires RS-485 to RS232 converter for serial communication. Any standard converter could be used.
Node ID :	Any Node Id can be used to define the slave address for your PLC in Astra. Use a node ID from 00 to 255.

Following table details the RS232-C pin names and signal descriptions for 9 pin connector to PC side

Pin Number	Name	Description
1	<u>CD</u>	Not used
2	TXD	Transmitted Data
3	RXD	Received Data
4	<u>DTR</u>	Not used
5	SG	Signal Ground
6	<u>DSR</u>	Not used
7	<u>RTS</u>	Request to Send (Software controlled)
8	<u>CTS</u>	Not used
9	RI	Not used

⌘ Data Types and Addressing ⌘

Address Range:

Model Name : IDEC Micro-1:

Memory Range	Low Add.	High Add.	Read /Write	Data Types	Byte
Input Bits	I0	I15	R	Discrete	1 Bit
Output Bits	Q0	Q15	RW	Discrete	1 Bit
Internal Relay Bits	M0	M199	RW	Discrete	1 Bit
Shift Register Bits	R0	R120	RW	Discrete	1 Bit
Timer Preset Words	TP0	TP79	RW	Unsigned Integer	2
Counter Preset Words	CP0	CP46	RW	Unsigned Integer	2
Timer Words	TW0	TW79	R	Unsigned Integer	2
Counter Words	CW0	CW46	R	Unsigned Integer	2



Note: All the addresses are in decimal. Driver converts them to either octal or hex as required.

⌘ Data Types and Addressing ⌘

Model Name : IDEC Micro-3

Memory Range	Low Add.	High Add.	Read /Write	Data Types	Byte
Input Bits	I0	I31	R	Discrete	1 Bit
Output Bits	Q0	Q31	RW	Discrete	1 Bit
Internal Relay Bits	M0	M191	RW	Discrete	1 Bit
Shift Register Bits	R0	R63	RW	Discrete	1 Bit
Input Bytes	IS0	IS24	R	Byte	1
Output Bytes	QS0	QS24	RW	Byte	1
Internal Relay Bytes	MS0	MS191	RW	Byte	1
Shift Register Bytes	RS0	RS56	RW	Byte	1
Data Register Bytes	DS0	DS99	R	Byte	1
Input Words	IW0	IW15	R	Unsigned Integer	2
Output Words	QW0	QW15	RW	Unsigned Integer	2
Internal Relay Words	MW0	MW191	RW	Unsigned Integer	2
Shift Register Words	RW0	RW48	RW	Unsigned Integer	2
Data Register Words	DW0	DW99	RW	Unsigned Integer	2
Timer Preset Words	TP0	TP31	RW	Unsigned Integer	2
Counter Preset Words	CP0	CP31	RW	Unsigned Integer	2
Timer Words	TW0	TW31	R	Unsigned Integer	2
Counter Words	CW0	CW31	R	Unsigned Integer	2



Note: All the addresses are in decimal. Driver converts them to either octal or hex as required.



Optimizations



Use the following guidelines so that you can get an optimum performance from the driver PLC combination.

- ⦿ Whenever possible, use consecutive addresses, this reduces the overhead on the communication per requested data byte, word or double word.
- ⦿ When a same address is to be used for two different tags in Astra, make sure that the scan time is the same for both the tags, this ensures that the address is fetched only once for both the tags.
- ⦿ Use higher scan rates whenever the application allows to do so, this ensures that the critical tags with lower scan rates are fetched with minimum overhead.



Errors



The entire time a Astra project is running, the Event Logger displays the status and any errors that the program generates. The driver utilizes the Event Logger to display error messages regarding the driver. Below are the error messages, the probable cause and most likely solution to all the errors the driver can generate.

Errors displayed as strings

1. NULL Pointer for Login Data
2. NULL Pointer for Project Path
3. NULL Pointer for Tag Table
4. NULL Handle for Data Manager

Explanation : Internal Fatal Error.

Action : Contact Astra support.

5. Insufficient Memory for Request Manager
6. Insufficient Memory for Transaction Manager
7. Insufficient Memory for Device Manager

Explanation : Internal Fatal Error.

Action : Try making more memory available for the project.

8. Cannot Pagelock Tag Table

Explanation : Internal Fatal Error.

Action : Contact Astra support.



Errors



9. Cannot Open File PLCTAG.DAT

Explanation : Internal Fatal Error. The input file PLCTAG.DAT does not exist or is corrupt.

Action : Open the project in the configuration mode and close it, this process recompiles the the PLCTAG.DAT file.

10. Cannot Read File PLCTAG.DAT

11. Insufficient Memory for Tag

12. Insufficient Memory for Tag2

13. Insufficient Memory for Tag Container

14. Insufficient Memory for Node

15. Insufficient Memory for Node Container

Explanation : Internal Fatal Error.

Action : Try making more memory available for the project.

16. No Tags in the Project

Explanation : Internal Fatal Error. The driver detected no valid tags in the project.

Action : Recheck the project in the configuration mode. See if any tags are assigned to this particular device. See if the Node details are correct.

17. No Valid Nodes in the Project

Explanation : Internal Fatal Error. The driver detected no valid nodes in the project.

Action : Recheck the project in the configuration mode. See if the Node details are correct.

18. Multidrop not Supported

Explanation : Internal Fatal Error. An attempt was made to attach two nodes on the same driver when Multidrop is not supported.

Action: Recheck the project in the configuration mode. See if the Node details are correct.

19. Multiple nodes with same ID

Explanation : Internal Fatal Error. An attempt was made to attach two nodes on the same driver with same Node IDs.]

Action : Recheck the project in the configuration mode. See if the Node details are correct.

20. Insufficient Memory for Request

21. Insufficient Memory for Request2

22. Insufficient Memory for Request Container

23. Insufficient Memory for Dummy Request

24. Insufficient Memory for Action

25. Insufficient Memory for Action Container

26. Cannot Create Communication Window

Explanation : Internal Fatal Error.

Action : Try making more memory available for the project.



27. Cannot Open Communication Port

Explanation : Internal Fatal Error. Could not initialize the Communication port for the given settings.

Action : For the selected Communication port, check for -

- ⊙ If the port physically exists.
- ⊙ If the Communication hardware uses standard base addresses. COM1 uses hex 3F8 and COM2 uses hex 2F8.
- ⊙ If there is any IRQ contention at the hardware level. COM1 uses IRQ4 and COM2 uses IRQ3.
- ⊙ If any other program is already using the Communication port you have requested for
- ⊙ If any DOS level TSRs are running which are using the Communication port you have requested for.
- ⊙ If a mouse driver is installed on the same Communication port you have requested for in Windows environment.
- ⊙ If a mouse driver is installed on the same Communication port you have requested for on DOS environment.
- ⊙ If you have directly manipulated the PROJECT.INI file section [COM1] or [COM2], check if the settings for Baud Rate, Data Bits, Stop Bits and the Parity are standard. Try using the Communication port setting utility provided with Astra in case you are in doubts about the standard settings.

28. Cannot Build Communication DCB

Explanation : Internal Fatal Error. Could not initialize the Communication port for the given settings.

Action : If you have directly manipulated the PROJECT.INI file section [COM1] or [COM2], check if the settings for Baud Rate, Data Bits, Stop Bits and the Parity are standard. Try using the Communication port setting utility provided with Astra in case you are in doubts about the standard settings.

29. Cannot Set Communication State

Explanation : Internal Fatal Error. Could not initialize the Communication port for the given settings.

Action : If you have directly manipulated the PROJECT.INI file section [COM1] or [COM2], check if the settings for Baud Rate, Data Bits, Stop Bits and the Parity are standard. Try using the Communication port setting utility provided with Astra in case you are in doubts about the standard settings.



Errors



30.NULL Pointer for Model Names

Explanation : Internal Fatal Error.

Action : Contact Astra support.

31.Read Queue Full

32. Device Time Out

Explanation : The Device did not respond and the Device driver timed out. The Driver will retry the request to Device for a specified number of times and if the Device still does not respond the driver will HALT its transactions with the Device.

Action : If this happens during **initialization**, check –

- ⊙ Whether the Device power is on.
- ⊙ Whether the cable connections to the device are proper.
- ⊙ Whether the Node ID settings are proper in case the Device supports it.
- ⊙ Whether the Device model is the same as configured in the Node Configuration.
- ⊙ Whether the Communication hardware is proper and works.
- ⊙ Whether strong EMI or RFI fields are existent which cause noise on the Communication line.
- ⊙ Whether some turnaround delay is required, try changing the entries in the DRIVERS.INI file. This may be typically required for faster PCs on which Astra runs.

If this happens during the **Run**, check –

- ⊙ Whether other applications block the Windows, in such a case the retry mechanism will normally re-establish the Communication.
- ⊙ Whether the cable connections have been disturbed.
- ⊙ Whether the Device has malfunctioned.
- ⊙ Whether the Communication hardware is proper and works.

33. Invalid IEEE Format

Explanation : The 32 bits read from the Device contained bit values such that it could not be interpreted as a valid IEEE format.

Action : Use OEM software and initialize floating type tags in the plc.



Errors



34. Write Queue Full

Explanation : The write request sent by the Astra is queued for faster execution, the current limit for the queue size is 300. If the queue is full this message will be prompted and the latest request will be ignored.

Action : Go to the project configuration file and put an entry with section name "QueueSize". Under this section name, put a key name "WriteQueue", so that it looks like: [QueueSize]

WriteQueue = WXY

Where,

WXY can be upto 5000.

35. No Valid Tags in the Project

Explanation : Internal Fatal Error. The driver detected no valid tags in the project.

Action : Recheck the project in the configuration mode. See if any tags are assigned to this particular device. See if the Node details are correct.

36. Insufficient Memory for Register

37. Insufficient Memory for Tag Container2

38. Insufficient Memory for Register Container

Explanation : Internal Fatal Error.

Action : Try making more memory available for the project.

39. Tag Address Invalid

40. Tag Address Invalid2

Explanation : The address entered for a Tag is invalid.

Action : Reconfigure the project and check.

41. Driver Scan Halted

42. Driver Scan Halted2

Explanation : The driver has stopped communicating with the device. This may happen in two situations –

⊙ When the initial scan is complete - in this case this is just a status information.

⊙ When time-out has occurred and retry for establishing communication has failed.

Action : In the second case check –

⊙ If the cable connections have been disturbed.

⊙ If the Device has malfunctioned.

⊙ If the Communication hardware is proper and works.



Errors



43. Cannot Find INI File Entry, Setting Default Port

Explanation : The [PROTOCOL] section in PROJECT.INI does not have the driver name against the COM1 or the COM2 entry. In such a case default COM1 is selected as the Communication port.

Action : Run the Communication port setting utility provided with Astra and set all the parameters properly.

44. Cannot Initialise Driver Twice.

Explanation : The [PROTOCOL] section in PROJECT.INI does not have the driver name against the COM1 or the COM2 entry. In such a case default COM1 is selected as the Communication port.

Action : Run the Communication port setting utility provided with Astra and set all the parameters properly.

45. Cannot Run Without Initialisation

46. Cannot Run Without Initialization2

47. Cannot Write Without Initialisation

48. Cannot Build Frames Without Initialisation

Explanation : Due to some abnormal termination in a previous run, the Device Driver has not unloaded itself and hence could not reinitialise itself.

Action : Restart the project.

49. NULL Pointer for Queue

Explanation : Internal Fatal Error.

Action : Contact ASTRA support.

50. Invalid IEEE Format2

Explanation : The 32 bits read from the Device contained bit values such that it could not be interpreted as a valid IEEE format.

Action : Use OEM software and initialise floating type tags in the device.

51. Cannot Pagelock Buffer

Explanation : Internal Fatal Error.

Action : Contact ASTRA support.



Errors



52. Device Response Delay

Explanation : The Device did not respond and the Device driver timed out. The Driver will retry the request to Device for a specified number of times and if the Device still does not respond the driver will HALT its transactions with the Device.

Action : If this happens during **Initialisation** check –

- ⊙ If the Device is powered on.
- ⊙ If the cable connections to the device are proper.
- ⊙ If the Device model is the same as configured in the Node Configuration.
- ⊙ If the Communication hardware is proper and working.
- ⊙ If strong EMI or RFI fields are existent which cause noise on the Communication line.

If this happens during the **Run** check –

- ⊙ If in case other applications block the Windows, in such a case the retry mechanism will normally re-establish the Communication.
- ⊙ If the cable connections have been disturbed.
- ⊙ If the Device has malfunctioned.
- ⊙ If the Communication hardware is proper and working.

53. Response Check Sum Error

Explanation : The Device did respond but the bytes received were corrupt. The Driver will retry the request to Device.

Action : If this happens during **Initialisation** check –

- ⊙ If the Communication hardware is proper and working.
- ⊙ If strong EMI or RFI fields are existent which cause noise on the Communication line.
- ⊙ If the Communication port settings are proper.

If this happens during the **Run** check –

- ⊙ If the cable connections have been disturbed.
- ⊙ If the Device has malfunctioned.
- ⊙ If the Communication hardware is proper and working.



Errors



54. Data Over Flow

Explanation : Unexpected data in large volume was received on the Communication port.

Action : Check –

- ⦿ If the cable connections have been disturbed.
- ⦿ If the Device has malfunctioned.
- ⦿ If the Communication hardware is proper and working.

55. Model Name Invalid

Explanation : Internal Fatal Error. The model name associated with a particular Node was invalid.

Action : Open the project in the configuration mode. Check the model in the Node Configuration and close it.

56. Cannot Open File PLCTAG.DAT 2

57. Cannot Read File PLCTAG.DAT 2

58. Cannot Read File PLCTAG.DAT 3

Explanation : Internal Fatal Error. The input file PLCTAG.DAT does not exist or is corrupt.

Action : Open the project in the configuration mode and close it, this process recompiles the PLCTAG.DAT file.

59. Invalid BCD Format for a WORD

Explanation: The 16 bits read from the Device contained bit values such that it could not be interpreted as a valid BCD format.

Action: Use OEM software and initialise respective tags in the plc.

60. Invalid BCD Format for a DWORD

Explanation: The 32 bits read from the Device contained bit values such that it could not be interpreted as a valid BCD format.

Action : Use OEM software and initialise respective tags in the plc.

61. Invalid number for conversion to BCD for WORD

Explanation : The 32 bits read from the Device contained bit values such that it could not be interpreted as a valid BCD format.

Action : Use OEM software and initialise respective tags in the device.



Errors



62. Invalid number for conversion to BCD for DWORD

Explanation : The 32 bits given for write from ASTRA to the Device contained bit values such that it could not be interpreted as a valid BCD format. Write will not be done in these cases.

Action : Avoid such values.

63. Error Composing Write Request

Explanation : Write request could not be composed. This may happen in two cases –

⊙ Invalid number for write.

⊙ Write Queue full.

Action : Avoid non interpretable values, Avoid writing too fast.

64. Error Composing Read Request After Write

Explanation : A read request immediately following a write request could not be composed.

This may happen in two cases –

⊙ Invalid number for write.

⊙ Write Queue full.

Action : Avoid non interpretable values, Avoid writing too fast.

65. Node Failed.

Explanation: Internal Fatal Error. The Node was not able to communicate. In case of Multidrop PLC system the node id given to the nodes may be same or cable from PC to PLC may be faulty.

Action: Open the project in the configuration mode check the Node Configuration and close it. For Multidrop communication check the node ID. Check the cable.

66. Cannot Open File NODES.DAT

67. Cannot Read File NODES.DAT 2

Explanation: Internal Fatal Error. The input file NODES.DAT does not exist or is corrupt.

Action: Open the project in the configuration mode and close it, this process recompiles the NODES.DAT file.

68. Node set on by user.

Explanation: Not an error . It indicates that node is selected by the user. For Astra generated default tags for a PLC, in that if command tag is 0 then this message is displayed.

Action: None , as it indicates that node is selected by the user.



Errors



69. Node set off by user.

Explanation : Not an error . It indicates that node is unselected by the user. For ASTRA generated default tags for a DEVICE in that if command tag is 1 then this message is displayed.

Action : None, as it indicates that node is unselected by the user.

73. Node manager proc address not defined.

Explanation : Internal Fatal Error.

Action : Contact ASTRA support.

150. UNDEFINE_TAG

Explanation: This tag address is not defined in the plc. This error number is shown when user tries to write at those addresses.

Action : Define this tag address through ladder program.

151. INVALID_RESPONSE

Explanation: This tag address is not defined in the plc. This error number is shown when user tries to read at those addresses.

Action : Define this tag address through ladder program.

152. COMMUNICATION_ERROR :

Explanation: Indicates communication error (For example, checksum error).

Action : Check communication cable, COM port settings in the project.ini file.



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