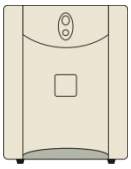
The APC Driver



The APC driver connects to an APC uninterruptible power supply using the UPS-Link communications protocol. Available for Commander and ObSys.

This document relates to APC driver version 1.0

Please read the *Commander Manual* or *ObSys Manual* alongside this document, available from *www.northbt.com*

Contents

Compatibility with the APC System

The APC driver allows North to interface with an uninterruptible power supply (UPS) from American Power Conversion (APC). It is possible to send various types of commands to an APC UPS, such as control commands, status inquiry commands and power inquiry commands.

The driver connects to a range of Smart-UPS legacy models supporting the UPS-Link protocol, via DB9 serial connection port (Fig. 1).

To connect with the more recent APC Smart-UPS ranges, use an APC network management card which is compatible with North's BACnet/IP and Modbus drivers.

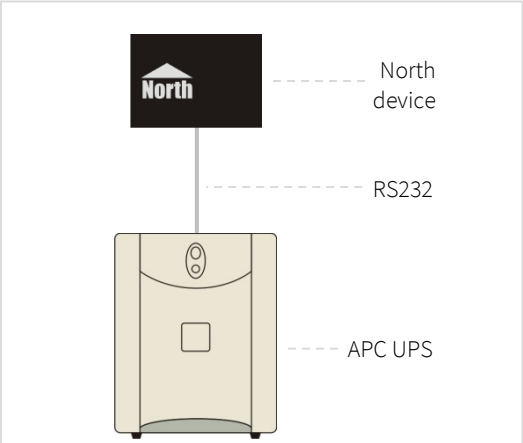


Fig. 1 North to APC

Equipment

APC UPS systems that are compatible with the driver:

- Smart-UPS 250
- Smart-UPS 400, UPS 370ci
- Smart-UPS 600
- Smart-UPS 900
- Smart-UPS 1250
- Smart-UPS 2000
- Matrix-UPS 3000
- Matrix-UPS 5000
- Smart-UPS 450
- Smart-UPS 700
- Smart-UPS 1000
- Smart-UPS 1400
- Smart-UPS 2200
- Smart-UPS 3000

Values

Depending on the type of UPS model, each can typically have the following values available:

- Operating mode
- Line/output voltage
- Load current
- Load power
- Temperature
- Battery voltage
- Fault status
- Time remaining
- Test battery

The UPS system can send alarms to the APC driver.

Prerequisites

Newer products use the incompatible Microlink protocol (identified by an RJ45 serial connection).

A legacy communications card is required to provide access using the UPS-Link protocol (APC part no. AP9620).

Using the Driver

On ObSys and Commander, the APC driver is pre-installed. On all of these North devices, you can use the driver to create an interface to an APC UPS. Once started, you will need to set up the driver before it can communicate with the APC system.

Making the Cable

Using the RS232 cable specification (Fig. 2), connect the North device COM port to the APC UPS. Connector types at each end of the cable are shown.

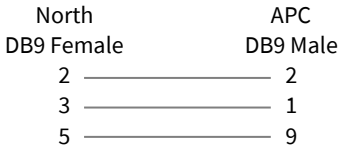


Fig. 2 North to APC UPS cable

The maximum RS232 cable length is 15m and should be as short possible.

Cables are available from North, order code CABLE/APC.

Starting the Interface

To start an interface using the APC driver, follow these steps:

- → **Start Engineering** your North device using ObSys
- → Navigate to **Configuration, Interfaces,** and set an unused **Interface** to 'APC' to start the particular interface
- → Navigate to the top-level of your North device and re-scan it

The driver setup object (Mc), labelled **APC Setup**, should now be available. If this object is not available, check an interface licence is available and the driver is installed.

Setting up the Driver

To set up the driver, follow these steps:

- → Navigate to the **APC setup** object (Mc). For example, if you started interface 1 with the driver earlier, then the object reference will be 'M1'
- → Set **RS232 Com port** to the port number of the North device you are connecting to APC
- → Set the **Baud Rate** to match that of the APC system. This is usually 2400 baud.

Checking Communications

You can check that the interface is communicating by reading the **Device Comms OK** object (DS). A value of 'Yes' indicates the driver has connected to, and is communicating with the APC system.

Alarms

When the APC system sends an alarm to the driver, the driver sends a North-format alarm to the device's alarm processing.

Format

North-format alarms contain six text fields. The APC driver places the following information into these fields:

System – copied from System Label object (DL) within driver setup

Point – see Point & Condition Fields below

Condition – see Point & Condition Fields below

Priority – '3'

Date & Time – from North device

Examples

System	Point	Condition	Priority	Date	Time
APC UPS	Line	Fail - 32 Minutes Remaining	3	04/01/12	14:22:00
APC UPS	Line	OK	3	04/01/12	14:25:16

Point and Condition Fields

The following point and condition fields can be sent by the driver:

Point	Condition
Line	Fail - x Minutes Remaining
Line	OK
Battery	Low
Battery	OK
Battery	Replace
Condition	Abnormal
Condition	OK
EEPROM	Changed

If there is a power line failure, the 'Minutes Remaining' alarm will be sent when first detected and then every 10 minutes. For the final 10 minutes remaining, the alarm will be sent every minute.

Object Specifications

Once an interface is started, one or more extra objects become available within the top-level object of the device. As with all North objects, each of these extra objects may contain sub-objects, (and each of these may contain sub-objects, and so on) – the whole object structure being a multi-layer hierarchy. It is possible to navigate around the objects using the ObSys Engineering Software.

Each object is specified below, along with its sub-objects.

Example Object Reference

An example of a reference to an object in the same device: the APC System (S1) contains an Internal Temperature (I.T). Therefore, the object reference will be 'S1.I.T'.

An example of a reference to an object in a different device: the IP network object (IP) contains Default Commander object (CDIP), which contains the object above (S1.I.T) – therefore the complete object reference is 'IP.CDIP.S1.I.T'.

Device Top-Level Objects

When an interface is started using the APC driver, the objects below become available within the top-level object of the device. For example, if Interface 1 is started, then the object with references 'M1' and 'S1' become available.

Description	Reference	Type
APC Setup Set up the APC driver, started on interface *c* (*c* is the interface number)	M*c*	Fixed Container: On the Commander platform this will be *[CDM v20\APC v10]* On the ObSys platform this will be *[OSM v20\APC v10]*
APC Smart-UPS Access APC system connected to interface *c* (*c* is the interface number)	S*c*	Variable Container: *[APC v10\UPS]* *[APC v10\UPS1000]*

APC Driver Setup

Object Type: *[OSM v20\APC v10]*
Object Type: *[CDM v20\APC v10]*

The APC driver contains the following objects:

Description	Reference	Type
RS232 COM Port	RS.COM	Obj\Num; Range: 1…8; Adjustable
RS232 Baud Rate	RS.BR	Obj\ENum; Adjustable Values: 4800, 9600
Device Comms OK Shows if communication with the APC system has been established	DL	Obj\NoYes
Device Label	DL	Obj\Text; Adjustable; 20 chars

APC System

Object Type: *[APC v10\UPS]*

An APC UPS contains the following objects:

Description	Reference	Type
UPS Type	UD.TY	Obj\ENum: 0…14 Values: 0=Not Known, 1=Smart-UPS 250, 2=Smart-UPS 400, 3=Smart-UPS 600, 4=Smart-UPS 900, 5=Smart-UPS 1250, 6=Smart-UPS 2000, 7=Smart-UPS 3000, 8=Smart-UPS 5000, 9=Smart-UPS 450, 10=Smart-UPS 700, 11=Smart-UPS 1000, 12=Smart-UPS 1400, 13=Smart-UPS 2200; 14=Smart-UPS 3000
UPS Model	UD.L	Obj\Text
UPS Serial Number	UD.SN	Obj\Text
UPS Manufacture Date	UD.MF	Obj\Text
Operating Mode	MD	Obj\ENum: 0…4; Adjustable values 0 and 1 only Values: 0=Off, 1=Online, 2=Battery; 3=SmartBoost, 4=SmartTrim
Line Voltage (VAC)	LN.V	Obj\Float
Line Voltage Max (VAC)	LN.MX	Obj\Float
Line Voltage Min (VAC)	LN.MN	Obj\Float
Output Voltage (VAC)	OP.V	Obj\Float
Operating Frequency (Hz)	F	Obj\Float
Load Current (rms)	L.C	Obj\Float
Load Power (% maxW)	L.P	Obj\Float
Apparent Load Power (% maxVA)	L.AP	Obj\Float
Internal Temperature (°C)	I.T	Obj\Float
Ambient Temperature (°C)	A.T	Obj\Float
Humidity (%RH)	H	Obj\Float
Battery Voltage (VDC)	B.V	Obj\Float
Battery Nominal Voltage Rating (VDC)	B.NV	Obj\Num
Battery Capacity (%)	B.C	Obj\Float
Run Time Remaining (mins)	B.TR	Obj\Num
Battery Replace	B.R	Obj\NoYes
Battery Low	B.L	Obj\NoYes
Battery Pack Count	BP.CNT	Obj\Num
Add Battery Pack Writing to this object increments the battery pack count by 1.	BP.ADD	Obj\NoYes
Subtract Battery Pack Writing to this object decrements the battery pack count by 1.	BP.SUB	Obj\NoYes
Battery Pack Bad Count	BP.B.CNT	Obj\Num
Overloaded Output	O.O	Obj\NoYes
Line Quality Unacceptable	LN.Q	Obj\NoYes
Transfer Cause	T.C	Obj\ENum: 0…5 Values: 0=None, 1=Unacceptable Voltage, 2=High Voltage, 3=Low Voltage, 4=Spike, 5=Engineer
Test Battery	B.T	Obj\NoYes
Battery Test Results	B.T.R	Obj\ENum Values: Insufficient capacity, Overload, New test needed
Simulate Power Fail	PWR.F	Obj\NoYes
Test Lights	L.T	Obj\NoYes
Calibrate Run Time	RT.CL	Obj\NoYes

Smart-UPS 1000 System

Object Type: *[APC v10\UPS1000]*

A Smart-UPS 1000 contains the following objects:

Description	Reference	Type
UPS Model	UD.L	Obj\Text
UPS Serial Number	UD.SN	Obj\Text
UPS Manufacture Date	UD.MF	Obj\Text
Operating Mode	MD	Obj\ENum: 0…4; Adjustable values 0 and 1 only Values: 0=Off, 1=Online, 2=Battery; 3=SmartBoost, 4=SmartTrim
Line Voltage (VAC)	LN.V	Obj\Float
Line Voltage Max (VAC)	LN.MX	Obj\Float
Line Voltage Min (VAC)	LN.MN	Obj\Float
Output Voltage (VAC)	OP.V	Obj\Float
Operating Frequency (Hz)	F	Obj\Float
Load Power (% maxW)	L.P	Obj\Float
Internal Temperature (°C)	I.T	Obj\Float
Battery Voltage (VDC)	B.V	Obj\Float
Battery Nominal Voltage Rating (VDC)	B.NV	Obj\Num
Battery Capacity (%)	B.C	Obj\Float
Run Time Remaining (mins)	B.TR	Obj\Num
Battery Replace	B.R	Obj\NoYes
Battery Low	B.L	Obj\NoYes
Battery Pack Count	BP.CNT	Obj\Num
Add Battery Pack Writing to this object increments the battery pack count by 1.	BP.ADD	Obj\NoYes
Subtract Battery Pack Writing to this object decrements the battery pack count by 1.	BP.SUB	Obj\NoYes
Overloaded Output	O.O	Obj\NoYes
Line Quality Unacceptable	LN.Q	Obj\NoYes
Transfer Cause	T.C	Obj\ENum: 0…5 Values: 0=None, 1=Unacceptable Voltage, 2=High Voltage, 3=Low Voltage, 4=Spike, 5=Engineer
Test Battery	B.T	Obj\NoYes
Battery Test Results	B.T.R	Obj\ENum Values: Insufficient capacity, Overload, New test needed
Simulate Power Fail	PWR.F	Obj\NoYes
Test Lights	L.T	Obj\NoYes
Calibrate Run Time	RT.CL	Obj\NoYes

Driver Versions

Version	Build Date	Details
1.0	1/8/2005	Driver released

Next Steps…

If you require help, contact support on 01273 694422 or visit *www.northbt.com/support*

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Document issued 09/07/2021.