HONEYWELL EXCEL 5000 OPEN SYSTEM

SYSTEM OVERVIEW
REVISION OVERVIEW .................................................................................................................................................................................................ii

THE EXCEL 100/500/600 SYSTEM ...............................................................................................................................................................................1
The User Programs ..........................................................................................................................................................................................2
Excel 100 Modules .........................................................................................................................................................................................2
Excel 100 Technical Data ..................................................................................................................................................................................3
The Excel 500–XCL5010 ....................................................................................................................................................................................4
The Excel 500/600 Internal Modules (not XCL5010) ........................................................................................................................................4
  XC5010C Computer Module ......................................................................................................................................................................5
  XC5210C Computer Module ......................................................................................................................................................................5
  XC6010 Computer Module ...........................................................................................................................................................................5
  XD506A / 508 Communication Submodules ........................................................................................................................................5
  XP502 Power Supply Module ......................................................................................................................................................................6
  XF521A Analog Input Module ....................................................................................................................................................................6
  XF526 Analog Input Module ....................................................................................................................................................................6
  XF522A Analog Output Module ...............................................................................................................................................................7
  XF527 Analog Output Module ...............................................................................................................................................................7
  XF523A Digital Input Module ...............................................................................................................................................................7
  XF524A Digital Output Module ...............................................................................................................................................................7
  XF529 Digital Output Module ...............................................................................................................................................................7
  XF525A Three-Position Output Module ................................................................................................................................................8
Summary of Internal Modules .......................................................................................................................................................................9
Additional Parts ..........................................................................................................................................................................................10
Distributed I/O Modules ..................................................................................................................................................................................11
  Analog Input Module XFL521B ................................................................................................................................................................11
  Analog Output Module XFL522B ............................................................................................................................................................12
  Digital Input Module XFL523B ............................................................................................................................................................12
  Digital Output Module XFL524B ............................................................................................................................................................12
  Manual Override Unit XFR522A for XFL522A ........................................................................................................................................12
  Manual Override Unit XFR524A for XFL524A ........................................................................................................................................13
Summary of Distributed I/O Modules ............................................................................................................................................................13
Additional Parts ........................................................................................................................................................................................14
  Excel Smart I/O Modules ........................................................................................................................................................................14
Time Programs ..........................................................................................................................................................................................15
System Texts ............................................................................................................................................................................................15
Installation and Commissioning ................................................................................................................................................................15
Excel 500/600 Technical Data .................................................................................................................................................................16

Remote Communication .............................................................................................................................................................................18

X1581 / X1582 OPERATOR UNIT ...............................................................................................................................................................19

XL-Online .................................................................................................................................................................................................21

CARE ENGINEERING SYSTEM .................................................................................................................................................................23

Live CARE Monitoring and Simulation Tool ........................................................................................................................................25

Trademark Information ..................................................................................................................................................................................
REVISION OVERVIEW

The following pages have been changed from the previous release of this document:

<table>
<thead>
<tr>
<th>Pages</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Reference to 209541B LonWorks termination module has been replaced with reference to XAL-Term.</td>
</tr>
</tbody>
</table>
Excel 100/500/600 is a freely programmable control and monitoring system for building applications. In addition to control applications for heating, ventilation and air conditioning, Excel 100/500/600 also performs energy management functions such as optimum start/stop, night purge, maximum load demand, and many others.

Freely programmable LonMARK controller (Excel 500, only)

The Excel 500 controller complies with the LonMARK® Interoperability Guidelines. It supports up to 512 NVs which can be mapped to data points. It can function on a LonWorks® network with Excel 10 and Excel 50 controllers, other Excel 500 controllers and their Distributed I/O modules, and third-party LonWorks devices and centrals. The Excel 500 provides the following unique benefits:

- Automatic binding of Excel 500 controllers and Honeywell I/O modules. This saves engineering time and cost over usual network variable (NV) binding. In addition, this saves on Echelon® node royalty fees.
- 512 NVs supported for integration and interoperation with other devices on the LonWorks network.
- NV-Booster® functionality avoids multiple NVs with many-to-one bindings and thus reduces the number of Excel 500 controllers needed.
- All binding information from and to the Excel 500 controller can be saved in Flash memory or uploaded together with the application and restored after power failure. This also allows exchange of controller hardware without redoing the complete binding.
- The Excel 500 controller allows conversion of NV types which increases flexibility and interoperability on a LonWorks network.
- With firmware 2.06.00 and higher, Excel 500 controllers support full Building Management Functionality (BMF) over LonWorks (alarming, scheduling, trending).

Connection to building supervisors

Up to eight building supervisors can be connected via the Honeywell system bus (C-Bus). Excel 100/500/600 allows communication with an EBI/SymmetrE building supervisor via modem or ISDN terminal adapter.

Communication via analog/ISDN modem

Excel 500 (with firmware version 2.01.00 and higher) and Excel 100C allow direct connection of an analog modem or ISDN terminal adapter, with data transmission rates of up to 38.4 Kbaud.

Modular design and easy operation

The modular design enables the system to be expanded to meet the growing needs of the building. The user addresses and the full English-language descriptors are stored in the controller and are, therefore, available to be viewed locally, at the operator unit, without the need for a central PC.

NOTE: The Excel 500-XCL5010 and the Excel 100C have no internal display; thus, an XI582 or an XL-Online is needed.

Distributed I/O modules and Excel Smart I/O modules connected via LonWorks® bus

The modules consist of an electronic module and a terminal module. The terminal module provides terminals for all field signals. Internal wiring between the Excel 500 controller and the field terminals is not required (except for the 2-wire LonWorks bus connection). Optional manual override modules and manual disconnect modules are available.

Excel Smart I/O modules are LonMARK association-compliant devices, and are thus suitable for all LonWorks environments. They feature a variety of software-configurable digital and analog inputs and outputs and can be installed at strategic locations throughout buildings.

NOTE: The Excel 500-XCL5010 can be connected only to external I/O modules. The connection of internal plug-in modules is not possible.

Large remote trend buffer

The XC5210C Excel 500 CPU module provides an enlarged remote trend buffer which allows more than 10,000 historical values to be stored and transmitted to a building supervisor.
## The User Programs

<table>
<thead>
<tr>
<th>Free selection of applications</th>
<th>The Excel 100/500/600 receives its user programs in three different ways:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent applications from EPROM</td>
<td>With the selection of the applications for the EPROM, the user program is assembled from permanently programmed functions when starting the system for the first time – no further programming tools are necessary. With Flash-EPROM, applications can be stored restored via the operator interface.</td>
</tr>
<tr>
<td>Configurable applications</td>
<td>With the CARE engineering system, standard applications for heating, ventilation and air conditioning technology can be assembled and extended as desired.</td>
</tr>
<tr>
<td>No programming experience needed</td>
<td>With free program preparation using CARE, the user program is generated automatically after graphical preparation of the system schematic diagram, the instrumentation and control strategies.</td>
</tr>
</tbody>
</table>
Excel 100 Modules

**MCE 3 and MCE 1**
The MCE 3 and MCE 1 are analog/digital converters that convert analog outputs of the Excel 100 into digital outputs. The MCE 1 converts one analog output into one voltage-free changeover contact. The MCE 3 converts three analog inputs into two voltage-free outputs and one N.O. contact.

**MCD 3**
The MCD 3 is an analog/digital converter that converts 1 analog output into one voltage-free changeover contact and one analog output into a three-point output.

**MCM 1**
The MCM 1 is a 4-channel separation module that provides active switching voltages to the digital inputs of the Excel 100 from up to four voltage-free contacts.

Excel 100 Technical Data

**Voltage:**
- 24 Vac, ± 20%, 50 to 60 Hz
- 24 Vdc, + 20%, – 10%

**IMPORTANT**
If the Excel 100C is supported with, e.g. a battery or accumulator, it has to be assured that no “pumping” of the power supply occurs.

**Maximum number of devices per System Bus:**
- 30

**Power consumption:**
- max. 40 VA (max. 30 W)

**Ambient temperature:**
- During operation: 0 to 50°C (0 to 45°C when mounted horizontally)
- During storage: -20 to 60°C

**Ambient humidity:**
- During operation and storage 5 to 90% r.h.

**Dimensions of housing:**
- 235 x 192 x 72 mm (H x W x D)

**Mounting:**
- Wall or DIN rail mounting

**Program back-up during power failure:**
- 72 hours via gold capacitor

**Protection class:**
- IP 30 (with cover mounted)

**Operator units:**
- Operator unit XI582 desktop or wall mounting
- XL-Online

<table>
<thead>
<tr>
<th>Module Type</th>
<th>Type</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog/digital converter</td>
<td>MCD 1</td>
<td>1 analog input for one voltage-free changeover contact</td>
</tr>
<tr>
<td>Analog/digital converter</td>
<td>MCD 3</td>
<td>1 analog input for one voltage-free changeover contact, 1 analog input for one three-point output</td>
</tr>
<tr>
<td>Analog/digital converter</td>
<td>MCE 3</td>
<td>2 analog inputs for two voltage-free changeover contacts; 1 analog input for one voltage-free N.O. contact</td>
</tr>
<tr>
<td>Separation module</td>
<td>MCM 1</td>
<td>4 voltage-free contacts for 4 digital inputs</td>
</tr>
</tbody>
</table>
The Excel 500–XCL5010

The Excel 500–XCL5010 controller is specially designed for operation with Distributed I/O modules or Smart I/O modules via a LONWORKS bus. Control and monitoring functions are performed by means of programmable, 16-bit microprocessor controlled, digital technology. The Excel 500 System is freely programmable and can be used as a stand-alone controller or as part of a network of up to 30 controllers connected via a C-bus (9.6 Kbaud up to 76.8 Kbaud) or as part of an open LONWORKS network.

The Excel 500 System provides energy management and control functions in Honeywell C-Bus networks or in LONWORKS networks. In the case of a Honeywell C-Bus network, up to 16 Distributed I/O modules with up to 128 inputs and outputs can be connected. A maximum of 10 modules of the same type is allowed per system. In the case of a LONWORKS network, the maximum number of Distributed I/O modules is determined by the number of NVs needed for interoperability. In a typical case, 190 physical inputs and outputs can be controlled per Excel 500.

Applications for the Excel 500 can be programmed during CARE engineering and then downloaded in the Flash EPROM.

Memory is buffered by a gold capacitor and will be supported for approximately 72 hours in case of a power failure.

The XCL5010 controller comprises an internal power supply and allows the connection of CPU and I/O modules to the same transformer (shared transformer).

An external MMI, modem, or ISDN adapter can be connected to the controller's serial port.

The Communication Module provides ports for C-bus and LONWORKS bus connection, as well as LEDs for indicating the controller's operational status, transmit status, and receive status.

The Excel 500/600 Internal Modules (not XCL5010)

The Excel 500/600 system with internal modules is comprised of the XC5010C (Excel 500) or XC6010 (Excel 600) computer modules for freely programmable applications, the power supply module XP501 or XP502 with an external transformer as well as a range of input and output modules.

Clear functional allocation

The internal input and output modules are:
- Analog input modules: XF521A / XF526
- Analog output modules: XF522A / XF527
- Digital input modules: XF523A / XF528
- Digital output modules: XF524A / XF529
- Three-position output module: XF525A

One important functional characteristic of the output modules XF522A, XF524A and XF525A is the integral manual override facility to switch equipment and position actuators directly from the module. The output modules XF527 and XF529 are equipment variants without manual override switches. The status of the inputs and outputs is shown by LEDs.

An Excel 500/600 can consist of 16 input and output modules providing a total of 128 points. The system can be expanded by connecting additional controllers if the number of inputs and outputs is insufficient for a particular application. Communication is performed via the system bus.

In general, the maximum system bus length is 1200 meters. However, a bus repeater (XD509) is available to exceed this limit.
The XC5010C computer module is the brain of Excel 500 and features internal modules. Control and monitoring functions are performed by means of programmable, 16-bit microprocessor controlled, digital technology. The program is held in RAM, but it can also be saved onto a Flash-EPROM. RAM is buffered by a gold capacitor and is supported for approx. 72 hours in case of a power failure.

The XC5010C adds support for a LONWORKS network connection to Distributed I/O modules and to other controllers and LONMARK devices. Serial interface communication support for MMI is possible via two interfaces, Sub-D (front) and 18-pin male (back), which can be selected using a switch on the front panel. The interface enables the system to be expanded to up to 30 devices including a building supervisor. Communication is performed via the system bus using a token-passing multi-master structure. LEDs indicate the operational status as well as the transmit / receive status of the interfaces.

The XC5210C computer module has all the same functions and capabilities as the XC5010C described above with one exception. Increased memory allows for a greatly increased remote trend buffer capacity – up to 10,000 values can be stored.

The XC6010 computer module is the 32-bit, high performance version of the XC5010C computer module. It features more memory and faster DCC cycle-times as well as faster scanning times in combination with some of the input / output modules.

The XC6010 computer module has only a single serial interface connection and does not support LONWORKS bus connections; therefore, Distributed I/O modules cannot be used with the XC6010C.

The submodules XD505A and XD508 are used for C-bus communication with older Excel 100/500 and Excel 600 controllers. The submodules are plugged onto the Excel 100B or XC5010B/XC6010 computer modules.
XP502 Power Supply Module

The XP502 power supply module supplies the low voltage power to the internal modules via the internal bus.

- The on/off switch for the power supply is situated on the front panel of the XP502 power supply module.
- The module can be connected with an external uninterruptible power supply (UPS), XAPU 24-2F.
- LEDs indicate the operating status, status of the watchdog relay and operation by battery.

XF521A Analog Input Module

The XF521A analog input module has eight inputs. It converts data from analog sensors PT 1000, NTC 20K, 0 to 10V and (0…20 mA, 4…20 mA). The resolution is 12 bit. The characteristic curves for the different sensor types are entered in the data point description.

XF526 Analog Input Module

The XF526 analog input module has eight inputs. It converts data from additional analog sensors: PT 100, PT 1000, PT 3000, BALCO 500, NTC 20K, 0 to 10V and (0…20 mA, 4…20 mA). The characteristic curves for the different sensor types are entered in the data point description.

The single LED indicates that the internal processor is working.
### XF522A Analog Output Module

The XF522A analog output module has eight outputs that supply a 0…10V signal. The resolution is 8 bit.

Five of the outputs are equipped with a manual override switch that can be used to select 0V, 10V or automatic operation.

The module can be adapted to suit a variety of actuators by entering the characteristic curves in the data point description.

The intensity of the LEDs is proportional to the output voltage.

### XF527 Analog Output Module

This module has the same functionality as XF522A, but without manual override switches. The analog outputs are controlled by software, only.

### XF523A Digital Input Module

The XF523A digital input module has twelve inputs. It processes floating signals as well as non-floating signals up to 24 V AC/DC. The inputs can also be used as totalizer inputs.

**The following specifications apply to totalizer inputs:**

- **Inputs 1 and 2:**
  - Maximum frequency: 15 Hz
  - Minimum pulse duration: 20 msec
  - Minimum pulse interval: 33 msec

- **Inputs 3 to 12:**
  - Maximum frequency: 0.4 Hz
  - Minimum pulse duration: 1.25 sec
  - Minimum pulse interval: 1.25 sec

- LEDs indicate the respective status of the inputs. The LEDs are invertible (NO/NC).

### XF524A Digital Output Module

The XF524A output module has six relay outputs, including five with changeover contacts and one with a normally open contact.

The five changeover contacts can be activated and deactivated independent of the user program by a manual switch. This is particularly useful for commissioning and servicing. The relays are integrated in the XF524A module and eliminate the need for externally mounted interlocking relays and their associated additional wiring.

LEDs indicate the status of all six outputs.

### XF529 Digital Output Module

This module has the same functionality as XF524A, but without manual override switches. The digital outputs are controlled by software, only.
The XF525A three-position output module was specifically developed for controlling reversible actuators.

A total of three actuators can be connected directly to the XF525A three-position output module. Both 24 Vac and 240 Vac actuators can be operated. The module features radio interference suppression for actuators with a current draw of up to 0.2 A (240 Vac) or 1.2 A (24 Vac). The control relays are already incorporated in the three-position output module and eliminate the need for externally mounted interlocking relays and their associated additional wiring.

Actuators with different running times can be connected directly to this output module. The OPEN and CLOSE running times can be individually entered in the data point description for each actuator connected.

The three outputs can be independently set to + | 0 | - | AUTO by means of the manual override switch.

LEDs indicate if a signal is present at the output.
### Summary of Internal Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Name</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Manual Override Switches</th>
<th>LED Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer module</td>
<td>XC5010C (16-bit)</td>
<td>*</td>
<td>*</td>
<td>Normal, System error, Transmit, Receive, Ground loop, LONWorks service, C-bus receive, C-bus transmit</td>
<td>Normal, System error, Transmit, Receive, Ground loop, LONWorks service, C-bus receive, C-bus transmit</td>
</tr>
<tr>
<td></td>
<td>XC5210C (16-bit, large trend buffer)</td>
<td>*</td>
<td>*</td>
<td>Normal, System error, Transmit, Receive, Ground loop, LONWorks service, C-bus receive, C-bus transmit</td>
<td>Normal, System error, Transmit, Receive, Ground loop, LONWorks service, C-bus receive, C-bus transmit</td>
</tr>
<tr>
<td></td>
<td>XC6010 (32-bit)</td>
<td>*</td>
<td>*</td>
<td>System bus transmit, System bus receive</td>
<td>System bus transmit, System bus receive</td>
</tr>
<tr>
<td>Power supply module</td>
<td>XP502</td>
<td></td>
<td>(1 x) 0</td>
<td>Power supply, Watch dog, Battery</td>
<td>Power supply, Watch dog, Battery</td>
</tr>
<tr>
<td>Analog input module</td>
<td>XF521A</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>XF526</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog output module</td>
<td>XF522A</td>
<td>8</td>
<td>(5 x) 0</td>
<td>8 x Output intensity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>XF527</td>
<td>8</td>
<td></td>
<td>8 x Output intensity</td>
<td></td>
</tr>
<tr>
<td>Digital input module</td>
<td>XF523A</td>
<td>12</td>
<td></td>
<td>12 x Status, LEDs inevitable</td>
<td>12 x Status, LEDs inevitable</td>
</tr>
<tr>
<td>Digital output module</td>
<td>XF524A</td>
<td>5</td>
<td>(5 x) 0</td>
<td>6 x Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>changeover</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N.O. contact</td>
<td>1 Auto</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>XF529</td>
<td>5</td>
<td></td>
<td>6 x Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>changeover</td>
<td>1 N.O. contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three-position output module</td>
<td>XF525A</td>
<td>3</td>
<td>(3 x) 0</td>
<td>3 x Open close</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>three-position</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Auto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-bus repeater</td>
<td>XD509</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* RS232 connection on front or rear of XC5010C (switchable), only on rear of XC6010.

For XC6010, only, there are submodules for system bus combination, XD505A (10 KBit) / 508 (1 MBit).
Additional Parts

Excel 500/600 Socket / Housing (not XCL5010):

- Socket for wall mounting ....................................... XS563
- Socket for front door mounting ............................. XS564
- Housing (empty, without socket) ............................ XH561
- Blank cover .......................................................... XH562
- Operating unit, controller cover .............................. XIS581

Excel 500/600 Cable for housing connection:

⚠️ CAUTION

Incorrectly inserted cables can destroy the modules installed. Use the cables only as described.

- Cable 80 mm (not XCL5010) .............................. XW568
  Only for horizontal housing connection (housing along side one another).

- Cable 330 mm (not XCL5010) ............................ XW569
  Only for vertical housing connection (housings one above the other).

Cable for connection from controller to XI582:

- Cable to XI582 (2.5 m) (XC6010) ....................... XW564
- Cable to XI582 (5 m) (not XCL5010) ..................... XW565
- Cable to XI582 (15 m) (not XCL5010) .................. XW566
- Cable to XI582AH (5 m)
  (front Excel 100C, XC5010C/XC5210C/ XCL5010) ........ XW582
- Cable to XI582AH (5 m)
  (back Excel 100C, XC5010C/XC5210C) ............. XW583
- Adapter cable (for connection of Excel 100B, XC5010B/XC6010) .................. XW584

Cable for connection from computer module to PC / XL-Online:

- Cable to XL-Online (2.5 m) (XC6010) ................. XW567
- Cable to XL-Online (5 m)
  (Excel 100C, XC5010C/XC5210C/XCL5010) ..... XW585
Distributed I/O Modules

Distributed I/O modules are LONMARK-approved and can therefore be used in a LONWORKS network independently of an Excel 500 controller. See Distributed I/O Modules Product Data (EN0B-0090GE51) for more information.

Distributed I/O modules can be operated with Excel 500 controllers in C-Bus networks or in LONWORKS networks.

In C-Bus networks, it is possible to control up to a maximum of 16 I/O Distributed I/O modules. For the XC5010C, this means 16 total modules are supported, including both internal and distributed. The XCL5010 supports only Distributed I/O modules.

In LONWORKS networks, the maximum number of Distributed I/O modules to be used by a controller is determined by the number of NVs to be used for communication and interoperation. In a typical case, 190 physical inputs and outputs can be controlled per Excel 500.

The XFL521, 522, 523, and 524 modules are digital and analog I/O modules that can be installed at strategic locations within a building. As part of the EXCEL 5000 system, these modules convert sensor readings and provide output signals used for operating actuators.

The input and output modules are:
- Analog input module XFL521B
- Analog output module XFL522B
- Digital input module XFL523B
- Digital output module XFL524B

Each I/O module plugs into a base terminal block allowing communication with the CPU via the built-in LONWORKS bus and easy wiring to the devices. Each set of up to 10 Distributed I/O modules is connected to the LONWORKS bus via the XSL511 connector module. The modular system allows I/O modules to be removed from the system without disturbing the other modules.

A power LED (L1) and a service LED (L2) are located on each module. L2 indicates the current state of the bus node. ON indicates that the node has no application loaded, BLINKING indicates that the node has an application but has not yet been configured, and OFF indicates loaded application and configured.

Analog Input Module XFL521B

The XFL521B analog input module has eight input channels that can be used for connecting sensors or any device that provides an analog output (e.g. PT 1000, NTC 20K, 0…10 Vdc, 0…20 mA, 4…20 mA). The input values are read by the CPU and can then be used for monitoring or as parameters that can be used for controlling other devices. The resolution is 12 bit.
Analog Output Module XFL522B

The XFL522B analog output module has eight output channels that supply a 0…10 V signal. The resolution is 8 bit. The outputs can be used to control actuators or other suitable analog devices.

Digital Input Module XFL523B

The XFL523B digital input module has twelve input channels that can be used for connecting sensors or any device that provides a digital input. The input values are read by the CPU and can then be used for monitoring or as parameters that can be used for controlling other devices.

LEDs indicate the respective status of the inputs. Two different LED color sets for indicating the on/off states can be selected via a DIP switch (sw1: LEDs DI1 to D6; sw2: LEDs DI 7 to DI 12). The possible on/off colors are: yellow/none or red/green.

Digital Output Module XFL524B

The XFL524B digital output module has six isolated changeover contacts that can be connected to actuators or other switchable devices. LEDs indicate the status of all six outputs.

Manual Override Unit XFR522A for XFL522A

The XFR522A manual override module mounts directly on top of the XFL522A. Eight potentiometers on top of the module can be used to independently vary the output of each channel from 0% to 100%. Each potentiometer also has an automatic setting that causes the channel to operate normally. The LEDs of the XFL522A are also visible.

The manual override unit works independently from the CPU. A feedback signal that includes the user address, the operating mode (manual/auto), and its value is sent to the CPU if any changes are made using the manual override unit.
Manual Override Unit XFR524A for XFL524A

The XFR524A manual override module mounts directly on top of the XFL524A. Six switches on top of the module can be used to independently switch each of the digital outputs OFF (0) or ON (1). Each switch also has an automatic setting that causes the channel to operate normally. The LEDs of the XFL524A are also visible.

The manual override unit works independently from the CPU. A feedback signal that includes the user address, the operating mode (manual/auto), and its value is sent to the CPU if any changes are made using the manual override unit.

Summary of Distributed I/O Modules

Table 3. Excel 500 Distributed I/O modules

<table>
<thead>
<tr>
<th>module</th>
<th>name</th>
<th>inputs</th>
<th>outputs</th>
<th>manual override with feedback</th>
<th>LED display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input module</td>
<td>XFL521B</td>
<td>8</td>
<td></td>
<td></td>
<td>8 x output intensity</td>
</tr>
<tr>
<td>Analog output module</td>
<td>XFL522B</td>
<td>8</td>
<td>8 x output intensity</td>
<td>(8 x) potentiometers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with XFR522A</td>
<td>8</td>
<td></td>
<td></td>
<td>8 x output intensity</td>
</tr>
<tr>
<td>Digital input module</td>
<td>XFL523B</td>
<td>12</td>
<td></td>
<td></td>
<td>12 x status LEDs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(selectable colors)</td>
</tr>
<tr>
<td>Digital output module</td>
<td>XFL524B</td>
<td>6 changeover</td>
<td>6 x status LEDs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with XFR524A</td>
<td>6 changeover</td>
<td>(6 x) 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Auto</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 x status LEDs</td>
</tr>
</tbody>
</table>
Additional Parts

Socket / Housing:
- Terminal block for XFL521/522A/523 .......... XSL513
- Terminal block for XFL524A .................. XSL514

Additional modules:
- LONWORKS connector module .......... XSL511
- Manual disconnect module ............... XSL512

Accessories:
- Cover release tool ............................ XAL2
- Swivel label ..................................... XAL1
- Termination module .......................... XAL-Term

Excel Smart I/O Modules

Excel Smart I/O modules are LONMARK association-compliant devices, and can thus be used in all open LONWORKS environments. They feature a variety of software-configurable digital and analog inputs and outputs and are suitable for installation at strategic locations throughout your buildings. The modules convert physical input signals from sensors into network variables and the network variables into physical output signals for operating actuators.

The diverse mix of inputs and outputs (flexibly configurable using Honeywell’s LONMaker for Windows™ plug-in) makes the Excel Smart I/O ideally suited for a wide range of intelligent, distributed applications.
### Time Programs

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple and flexible time programs</td>
<td>The daily programs must first be defined before a time program can be created. A daily program is assigned to each weekday in the weekly program. This weekly program is automatically copied for every week in the annual program. Exceptions can be defined for any number of days by replacing the daily program directly in the annual program.</td>
</tr>
<tr>
<td>Automatic summer/winter changeover</td>
<td>The beginning and end of daylight savings time can be stored to automate the changeover from daylight savings time to standard time. The changeover is then performed automatically on the appropriate days.</td>
</tr>
</tbody>
</table>

### System Texts

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible text files</td>
<td>The text files are stored in the controller.</td>
</tr>
</tbody>
</table>

### Installation and Commissioning

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freely programmable application programs</td>
<td>When the application program for a freely programmable application is generated during CARE engineering, the complete documentation for the system and the wiring diagram are generated automatically.</td>
</tr>
<tr>
<td>Protection against program loss</td>
<td>The application program can be either loaded into the RAM of the computer module from disk or stored in the computer module’s Flash-EPROM.</td>
</tr>
<tr>
<td>User friendly service level</td>
<td>The various operating levels can be accessed by means of passwords.</td>
</tr>
<tr>
<td>In operator level 3, &quot;read and make changes&quot;, all inputs and outputs can be queried, set, or simulated. The current status of each input and output can be queried. All relay outputs can be activated or deactivated. Analog outputs can be set to a value between 0 and 100%. In order to simulate operating conditions, each digital input can be commanded ON or OFF and each analog input can be assigned a value between 0 and 100%.</td>
<td></td>
</tr>
<tr>
<td>This service level is useful for both commissioning and servicing.</td>
<td></td>
</tr>
<tr>
<td>Menu driven programming level</td>
<td>Operator level 4 of the XL-Online is primarily used to set the system parameters. Additionally, the system text and the time program can also be edited.</td>
</tr>
</tbody>
</table>

Excel 500/600 with internal modules (XC5010C/XC6010)  
Excel 500–XCL5010 with Communication Module
Excel 500/600 Technical Data

Voltage:
- XC5010C/
- XC6010: 24 Vac/dc, ± 20%
- XCL5010: 24 Vac, ± 20%

Maximum number of modules per Excel 500/600:
- 16 I/O modules (internal + Distributed; XCL5010 Distributed, only) with up to 128 inputs and outputs.
- Up to ten per module type.
- Up to ten XF524A digital output modules and XF525A three-position output modules combined (not XCL5010).

Maximum number of devices per System Bus:
- 30

Power consumption:
- XC5010C/XC5210C/
- XC6010: max. 40 VA (max. 30W)
- XCL5010: max. 5 VA (max. 4W)

Ambient temperature:
- During operation: 0 to 45 °C
- During storage: -20 to 70 °C

Ambient humidity:
- During operation and storage 5 to 90% r.h. (non-condensing)

Dimensions of housing:
- XC5010C/XC6010: 144 x 192 x 188 mm (H x W x D)
- XCL5010: 150 x 198 x 97 mm (H x W x D)

Mounting:
- Front door (not XCL5010) or panel mounting on DIN-rail

Program back-up during power failure:
- 72 hours for RAM (XC5010C/XCL5010)
- 1 month for RAM (XC6010)

Protection class:
- IP 30

Operator units:
- Operator unit XI581 on unit housing (not XCL5010)
- Operator unit XI582 desktop or wall mounting
- XL-Online
Table 4. Excel 500/600 controllers and internal modules

<table>
<thead>
<tr>
<th>module</th>
<th>type</th>
<th>hardware</th>
<th>software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer module</td>
<td>XC5010C/XC52010C, XCL5010</td>
<td>16 bit (internal + distributed)</td>
<td>Freely programmable</td>
</tr>
<tr>
<td></td>
<td>XC6010</td>
<td>16 bit (distributed, only)</td>
<td>LonWorks network interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freely programmable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No LonWorks network interface</td>
</tr>
<tr>
<td>Power supply module</td>
<td>XP502</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog input module</td>
<td>XF521A / XF526</td>
<td>8 analog inputs</td>
<td>polling every sec.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(240 ms with XC6010 fast mode)</td>
</tr>
<tr>
<td>Analog output module</td>
<td>XF522A / XF527</td>
<td>8 analog 0…10 V outputs</td>
<td>polling every sec.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital input module</td>
<td>XF523A</td>
<td>12 digital inputs</td>
<td>polling every sec.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(125 ms with XC6010)</td>
</tr>
<tr>
<td>Digital output module</td>
<td>XF524A / XF529</td>
<td>5 changeover contacts</td>
<td>polling every sec.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 normally open contact</td>
<td></td>
</tr>
<tr>
<td>Three pos. output. module</td>
<td>XF525A</td>
<td>3 three-position outputs</td>
<td>polling every 0.5 sec.</td>
</tr>
</tbody>
</table>

Table 5. Excel 500 Distributed I/O modules

<table>
<thead>
<tr>
<th>module</th>
<th>type</th>
<th>hardware</th>
<th>software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input module</td>
<td>XFL521B</td>
<td>8 analog inputs</td>
<td>polling every sec.</td>
</tr>
<tr>
<td>Analog output module</td>
<td>XFL522B</td>
<td>8 analog outputs</td>
<td>updating every sec.</td>
</tr>
<tr>
<td>Digital input module</td>
<td>XFL523B</td>
<td>12 digital inputs</td>
<td>polling every sec.</td>
</tr>
<tr>
<td>Digital output module</td>
<td>XFL524B</td>
<td>6 changeover contacts</td>
<td>updating every sec.</td>
</tr>
</tbody>
</table>

Table 6. Excel Smart I/O modules

<table>
<thead>
<tr>
<th>type</th>
<th>power</th>
<th>overrides</th>
<th>universal inputs</th>
<th>digital inputs</th>
<th>analog inputs</th>
<th>relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>XFC2A05001</td>
<td>230 Vac</td>
<td>no</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC2A06001</td>
<td>230 Vac</td>
<td>no</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC3A04001</td>
<td>24 Vac</td>
<td>no</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC3A05001</td>
<td>24 Vac</td>
<td>no</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC3A06001</td>
<td>24 Vac</td>
<td>no</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC2D05001</td>
<td>230 Vac</td>
<td>yes</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC2D06001</td>
<td>230 Vac</td>
<td>yes</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC3D04001</td>
<td>24 Vac</td>
<td>yes</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC3D05001</td>
<td>24 Vac</td>
<td>yes</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>XFC3D06001</td>
<td>24 Vac</td>
<td>yes</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>
There are several possibilities for communication of alarms, trending information, and system data points to a remote building supervisor via modem.

**Excel 100C / Excel 500**

Excel 500 controllers with firmware version 2.1.x and higher and Excel 100C controllers can have a modem or ISDN terminal adapter connected directly to their serial port. This allows communication with an EBI/SymmetrE building supervisor at data transmission rates of up to 38.4 Kbaud.

The Excel 100C or Excel 500 controller connected to the modem/ISDN terminal adapter may function as a normal building controller, but it has a buffer that can store up to 100 trend samples.
XI581 / XI582 OPERATOR UNIT

**Easy handling on site**

The XI581 (XC5010C/XC6010, only) or XI582 is the command and information center of the Excel 100/500/600. Data, such as setpoint values and time switching programs, can be entered via the operator unit. Important information such as actual temperature values, control status, etc. can also be displayed.

**Buswide access**

Buswide access allows communication between an XI581 or XI582 and an Excel Controller that is not directly connected to this operator unit. Communication can include reading from and writing to the remote controller as well as receiving alarm status information.

**Clear display**

A menu-driven graphic display with six lines, 34 characters per line and eight clearly marked keys make the device easy to use. The entire operation uses plain language text stored in the controller, which can be freely accessed by the user. In addition, the display features a backlight.

**Security due to password controlled operating levels**

The device can be operated at three levels, thereby protecting the data from unauthorized access.

- **Level 1:** Read only without password
- **Level 2:** Read plus limited changes with a password
- **Level 3:** Read and make changes with a password

**Operator units can be positioned anywhere**

XI581 is mounted directly on the unit housing (XC5010C/XC6010, only).

XI582 is the desktop model and is also suitable for wall mounting.

Both devices are connected to the operating interface on the computer module. The wall and desktop units can be positioned up to 15 meters from the computer module.

![XI581 Controller-mounted operator terminal](image1)

![XI582 Desktop operator terminal](image2)
User friendly operation

The XL-Online is the local intelligent operating and service device. It performs all the operating functions of the XI581/XI582 as well as having all the advantages of a PC. In addition to being able to make major modifications, such as changing setpoint values and time program switching points, the XL-Online also offers all the service and commissioning functions.

Password protected operating levels for:
- User functions
- Service functions
- Programming functions

The Excel Online can be operated at five levels, 3 of which are protected against unauthorized access.

**Level 1:** Read only
**Level 2:** Change data (e.g. time program)
**Level 3:** Change data (e.g. data point description)
**Level 4:** Change parameters
**Level 5:** Definition of new operators

A printer can be connected to the XL-Online's parallel interface to log alarms and messages.

Like the XI582, the XL-Online can also be placed up to 15 meters from the computer module.
The CARE engineering system is a software package that can be installed on a personal computer.

The PC must satisfy the following requirements:
- Pentium 90 MHz CPU (166 MHz recommended)
- 1 free serial interface
- VGA graphics card (800 x 600 points)
- Color monitor
- 32 MB RAM (64 MB recommended)
- 1 floppy disk drive
- 50 MB of available hard disk space (100 MB recommended)
- Printer supported by MS WinWord® (HP LaserJet® recommended)
- Microsoft® or compatible mouse

Software requirements
- Microsoft® Windows™ 95/98, -NT 4.0 SR1
- For enhanced printing: MS WinWord® V7.0 or higher

Program generation without programming knowledge
The CARE engineering system is a software package that enables an application program to be generated, which may be loaded and executed without any prior programming knowledge.

Control strategy using CARE
Heating, ventilating and air conditioning systems are designed from pre-prepared individual diagrams using a menu driven system. The system is designed on the screen, and the control strategies and switching tables can be defined using graphical symbols.

In addition to the CARE engineering system’s main function of designing the system diagram with the appropriate control strategies and automatic generation of the application program, it can also generate time programs and system texts.
**Automatic documentation**

The user is then presented the final result by the CARE system. These results may be printed to a Winword document:

- List of required CPU hardware
- Wiring diagram
- Data point description
- Text lists
- Parameter list for each control circuit
- System diagrams
- Control strategies
- Switching tables
- Time programs

**Modular application library**

In addition to generating fully customized control strategies, the user may select pre-defined control solutions from a large set of applications. These intelligent Excel function modules (XFM) provide configurable, easy-to-use control solutions for all kinds of HVAC applications.
**Watch applications at work**

Live CARE is an integral part of the CARE engineering system that allows online access to controllers. When working with Live CARE, the application is presented to the user in the same way as in the CARE engineering tool. This provides a convenient way to access and modify control parameters and data point values, thus allowing easy plant start-up and fine-tuning.

**Static simulator**

In addition to online access to controllers, the Live CARE simulator allows you to check and tune controller applications by simulating the behavior of the controller. This includes real-time, single-step or accelerated real-time simulation of:

- Time programs
- Control strategies
- Switching tables
- Data points