# IEM V3.0

## Information on Installation and Use

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Please read this information carefully in its entirety prior to executing this procedure. This information is important and must be taken into account when installing and working with the Industrial Ethernet Module (IEM) V3.0.

It is very important that you download the latest readme file from the internet. Important information regarding the use of the latest version of the IEM and the latest updates will be provided. Also, any further important notes will also be updated within the online version.

To obtain the latest version please visit the Siemens support website at:

http://support.automation.siemens.com

The online version of this readme file supersedes the version installed by the IEM and the version found on the IEM CD.

**NOTE: IT IS RECOMMENDED THAT NECESSARY PRECAUTIONS ARE TAKEN TO YOUR PLANT OPERATION PRIOR TO INSTALLING THE IEM AND INCLUDING THE PARAMETERIZATION OF THE IEM. SIEMENS DOES NOT ACCEPT ANY RESPONSIBILITY FOR ANY PROBLEMS THAT MAY OCCUR DURING THIS PROCEDURE AS ON-LINE CHANGES TO A RUNNING SYSTEM ARE ALWAYS A RISK.**

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# 1 Installing the Optional APACS+ Communication Blocks

## 1.1 Software Requirements

- Operating Systems - Windows XP, 2003 Server, Windows 7 x32/x64 or Windows Server 2008 x64
- Internet Explorer V6.0, SP1 or greater
- PCS 7 OS V6.0 SP3 or greater to use the S7 GW_SEND and GW_REC blocks
- APACS+ V4.42 or later controller code to use the APACS+ GW_SEND and GW_REC blocks
- ACMx V4.50 or later controller code to use the APACS+ GW_SEND and GW_REC blocks
- QUADLOG V3.40 or later controller code to use the QUADLOG GW_SEND and GW_REC blocks
- CCMx V3.52 or later controller code to use the QUADLOG GW_SEND and GW_REC blocks
- Adobe Reader V5.0 or greater

## 1.2 Hardware Requirements

A USB flash drive with a capacity of one megabyte or more is required to configure the system. The flash drive should not require additional software or drivers in order to be used in a PC as well as the IEM.

When using a new flash drive for the first time, the flash drive should be inserted into the USB port of the running IEM until the configuration is written to the flash drive before power-cycling the IEM to configure it. The IEM beeper will sound when the configuration has been written to the new flash drive.

## 1.3 Contents of the IEM V3.0 Package

The IEM contains the following components:

- 1 CD with the installation software that includes the NIM32 user interface, the GW_SEND and GW_REC blocks, and documentation
- 1 IEM
- 1 M-Bus Y-cable to attach the IEM to an APACS+/QUADLOG control system
- 1 Certificate of License for Documentation and Drivers SIMATIC PC
- 1 Certificate of License for SIMATIC NET software V7.1 SP3
- 1 Documentation package for the SIMATIC PC Box 627C
- 1 set of mounting rails and screws for the IEM
- 1 Power cord for the IEM

## 1.4 Installing the IEM components from the CD to the Engineering Station with APACS+ Control

The setup program takes you through the installation process step-by-step. To install the optional packages, proceed as follows:

1. Make sure that the software requirements are fully installed.
2. Start SETUP.EXE on the **IEM CD**
3. Follow the instructions of the setup program.
    - The NIM32 user interface is used to configure any NIM32, and to get diagnostic messages from any NIM32 and the IEM.
    - The GW_SEND and GW_REC blocks are only used for the exchange of data between APACS+/QUADLOG and S7 systems. There is a separate version of the blocks for each system supported.

### 1.5 Uninstalling the IEM components

Follow the usual procedure for applications under Windows:

1. Close all SIMATIC software on the PC/PG Device.
2. Open "Control Panel" by choosing **Start > Settings > Control Panel**.
3. Start the software un-install dialog box under Windows by double-clicking "**Add/Remove Programs**" in "Control Panel".
4. Select "S7 IEM Communication Function Blocks" from the list of installed software. Click the "**Add/Remove...**" button to uninstall the S7 GW_SEND and GW_REC blocks.
5. Select "ProcessSuite" or "APACS+ Control" from the list of installed software. Click the "**Add/Remove...**" button to uninstall the APACS+ GW_SEND and GW_REC blocks, the Quadlog GW_SEND and GW_REC blocks, and the NIM32 user interface.

## 2 What's New about BoxPC 627C IEM V3.0

### 2.1 Compatibility

The IEM V3.0 firmware is compatible with the BoxPC 627C IEM V3.0 6EQ2020-0AC03-5XX0. The IEM V3.0 can communicate with older IEMs running firmware V2.1.

### 2.2 Hardware

The BoxPC 627C IEM V3.0 hardware has the following new features.

- ECC RAM (Error Correcting RAM)
- Gigabit Ethernet (requires the correct cabling, such as CAT5e or CAT6 and the correct network components to take advantage of the speed improvement)
- Faster Processor and onboard chipset

### 2.3 Firmware

The following features are available in the BoxPC 627C IEM V3.0 firmware:

#### File Based Write Filter (FBWF)

The File Based Write Filter (FBWF) has been enabled to minimize writes to the onboard CompactFlash.

#### Windows Firewall

The Windows Firewall has been enabled and only has the ports necessary for configuration and diagnosing problems.

**Note:** Because of the Windows Firewall which is enabled on the BoxPC 627C IEM V3.0 it may be necessary to setup a HOSTS files on the PCs requiring access to these IEMs. For instance, a PC with 4-Mation installed requires access to an IEM which is a Box PC 627C IEM V3.0. In this case a HOSTS file entry should be made for this IEM and its IP address. If this entry is created while the applications are running it will be necessary to stop the applications and restart them, i.e. 4-Mation, DLOGGER, etc.

**12 APACS+ Peer to Peer Connections**

The firmware has been enhanced to allow for 12 APACS+ Peer to Peer connections to be configured.

**Simultaneous APACS+ Peer to Peer and S7 Communications**

The firmware has been tested to allow for simultaneous APACS+ Peer to Peer communications and S7 to APACS communications. This means that an IEM can be configured to contain APACS+ Peer to Peer connections between IEMs and also contain connections to compatible S7 CPUs. There are still a maximum of eight (8) allowable APACS+/S7 CPU connections and a total of 12 allowable maximum connections. If you use two (2) APACS+/S7 CPU connections this means that there are a maximum avaialble 10 connections to be used for APACS+ Peer to Peer communications. If you configure eight (8) APACS+/S7 CPU connections (the maximum allowed) then this means that there are four (4) APACS+ Peer to Peer connections available.

**Redundant Communications Connection Health Status**

The firmware has been enhanced to include tags which can be configured to determine the heath of a redundant configuration. These tags can be read from within an APACS+ controller, from an S7 controller or from an HMI.

**TimeSync Enhancement**

The firmware update V2.1.0.13 which was made available on the previous IEM models (BoxPC 620 IEM, BoxPC 627 IEM and BoxPC 627B IEM) has been included in this BoxPC 627C IEM firmware.

These enhancements are only valid when the (APACSTIMEBROADCASTENABLED = 1) is set in the gateway.ini file.

a) Now the tolerance used by the APACS Time Master controller can be tuned by a new gateway.ini parameter APACSTIMETOLERANCE. This parameter has a default value of 250000 or 250 milliseconds. When the TIMESYNC function block of the APACS Time Master controller detects a difference between its Real Time Clock and time broadcasted from the IEM greater then the set APACSTIMETOLERANCE a class 1 26:14 warning “System Time Sync is Out of Tolerance” is logged to the diagnostic logger.

b) Now any new controllers detected or existing controllers removed from the APACS rack will force time set messages to be broadcasted from the IEM. These messages will set the Real Time Clock and post class 1 26:15 warnings "System Time Has Been Set" to the diagnostic logger.

**Standard GW Function Block Enhancements**

The standard GW function blocks (GW_SEND and GW_REC) for APACS+ (ACM, ACM+ and ACMx controllers) have been enhanced to allow string data to pass when using APACS+ peer-to-peer connections (details are found in the IEM User's Guide).

In addition a known issue where the previous blocks will not allow R_IDs greater then 127 in large configurations is now corrected with this enhancement to allow 1 thur 512.

- GW Function Block Library Version 4.45 for the ACM/ACM+
- GW Function Block Library Version 4.52 for the ACMx

# 3 Detailed Information on the BoxPC 627C IEM V3.0 Features

## 3.1 TimeSync Enhancement Usage

If desired this procedure below can be followed to determine if the APACSTIMETOLERANCE parameter is correctly set for your application.

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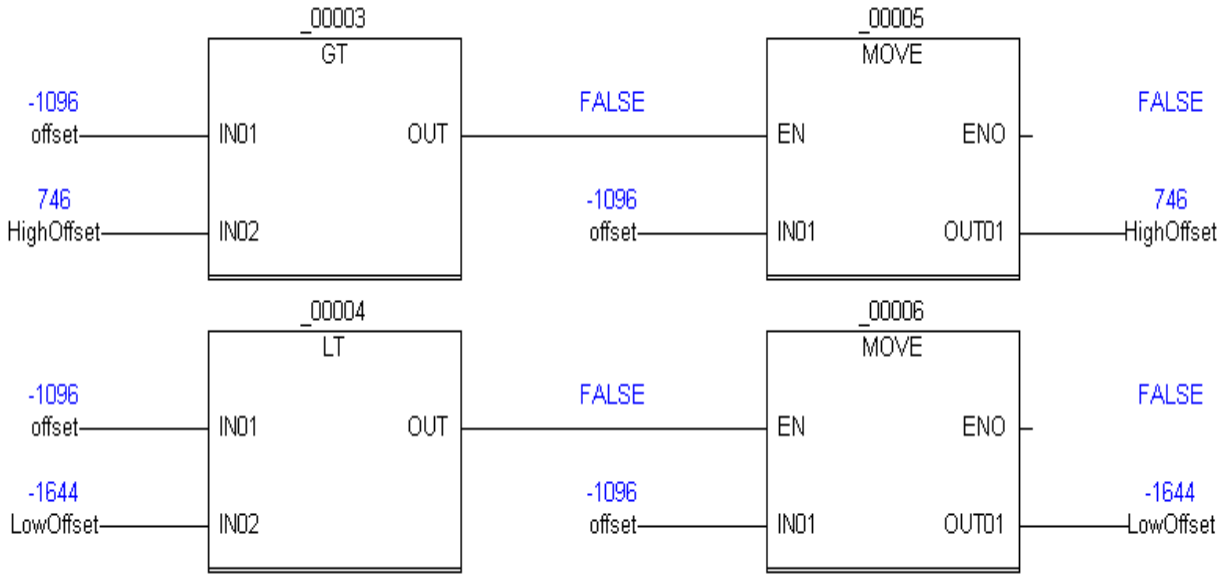
1. Pick one of the controllers where the APACS rack is connected to the IEM.

2. In 4-mation open the on-line controller. Open the RESOURCE_BLOCKS sheet (APACS controllers) or ResourceStatus sheet (QUADLOG controllers) to view the TIMESYNC function block. Note the TRACK output nub shows the node rack and slot of the tracking source, on-line only as real time data is displayed. The Time Master controller would be the node rack and slot address of the IEM with appended "TimeSvc" (i.e. "N47R02S11TimeSvc"). It is better to monitor the Time Master controller for more accurate checking.

3. Add a variable to the OFFSET output (i.e. offset). This variable will feed this group of function blocks as they are laid down on an open section of this sheet. The 4 function blocks below can be used for this purpose. The "offset" variable is connected to the TIMESYNC OFFSET output nub. The HighOffset and LowOffset are also variables needed on the sheet but not connected to anything else as these will be used to latch the highest positive number and lowest negative number over some period of time (up to you).



4. Based on the HighOffset and LowOffset whichever value is greater can be used as a reference to set the APACSTIMETOLERANCE parameter in the gateway.ini file. Of course a much greater number then this reference should be used for the APACSTIMETOLERANCE parameter. If it is determined to make a change to the APACSTIMETOLERANCE parameter follow the procedure listed in the first section under "Installation Instructions" steps 10 and 11.

### 3.2 New Redundant IEM Connection Health Usage

If desired this procedure below can be followed to monitor redundant IEM connection health status on Ethernet and MBUS.

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Two new internal Boolean data tags have been added.

- Gateway.Ethernet.Quality
- Gateway.MBI.Quality

**Gateway.Ethernet.Quality**

The IEM V3.0 will now monitor the Ethernet adapter connection for activity, meaning Ethernet messages are continuing to be received. When activity is detected within a set timeout period the Gateway.Ethernet.Quality data tag will remain **true**. Otherwise if activity is not detected within the timeout period the Gateway.Ethernet.Quality data tag will transition to **false**. This data tag is not latched so when activity is detected again the value will transition **true** again. The timeout period mentioned is configurable. A new entry is found in the Gateway.ini file. This entry is ETHERNETQUALITYTIMEOUT with a default value of 3 seconds. If desired this entry can be changed (with integer values in seconds only) by following the standard for changing the IEM configuration using the Gateway.ini file. But for most practical purposes this value does not need to be changed.

**Gateway.MBI.Quality**

The IEM V3.0 will now monitor the MBI adapter connection for activity, meaning any APACS or QUADLOG controller active on the MBUS is considered active. When activity is detected within a set timeout period the Gateway.MBI.Quality data tag will remain **true**. Otherwise if activity is not detected within the timeout period the Gateway.MBI.Quality data tag will transition to **false**. This data tag is not latched so when activity is detected again the value will transition **true** again. The timeout period mentioned is configurable. A new entry is found in the Gateway.ini file. This entry is MBIQUALITYTIMEOUT with a default value of 6 seconds. If desired this entry can be changed (with integer values in seconds only) by following the standard for changing the IEM configuration using the Gateway.ini file. But for most practical purposes this value does not need to be changed.

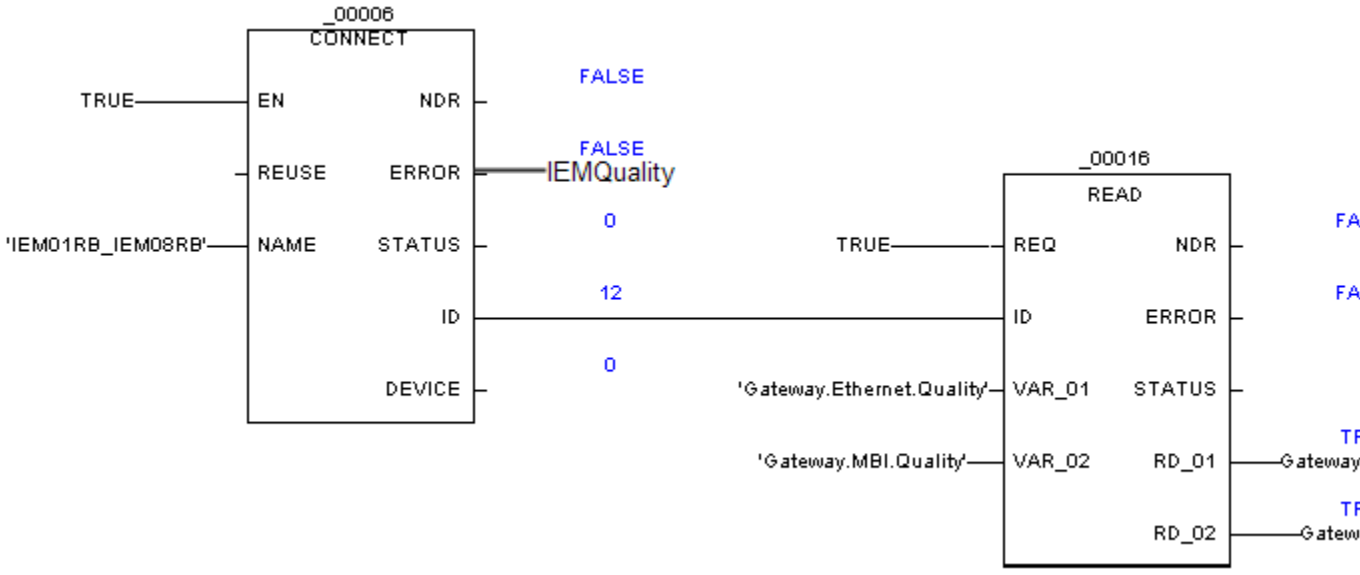
**Ways to Implement**

Since these two new data tags are internal to the IEM any APACS+ Peer to Peer connection or APACS+ to S7 connection can be used. This means any one connection configured in the iem2iem.txt file can be used. If no APACS+ Peer to Peer connections or no APACS+ to S7 connections are required for your configuration simply add a dummy APACS+ Peer to Peer connection with a unique name to other IEMs on the same Ethernet network and IP address can be bogus but fit the normal format (xxx.xxx.xxx.xxx). The creation of a connection in the IEM creates a virtual controller of the connection name. It is this virtual controller that provides access to the IEM diagnostics.

Two methods exist to retrieve the values of these data tags, either can be used based on your configuration needs. But this is done for each redundant IEM to monitor all connections.

- Recommended method - In the APACS+ controller add a CONNECT function block with NAME input set to the connection name (from the iem2iem.txt file). The ID output is then connected to a READ function block ID input. Then set VAR_01 string to 'Gateway.Ethernet.Quality' and VAR_02 string to 'Gateway.MBI.Quality'. The RD_01 and RD_02 outputs must have Boolean variables connected as seen below. Note if the READ function block Continuous_REQ softlist is set true the data tags are continuously read. This allows any other logic in the APACS+ controller to act on GatewayEthernetQ and GatewayMBIQ (ie. can feed alarm status blocks) in addition the CONNECT function block ERROR output can be monitored if the IEM totally stops functioning.

*** To add HMI alarming to the function blocks below add Discrete Alarm blocks (HLLDA1) to the GatewayEthernetQ, GatewayMBIQ and IEMQuality outputs to generate HMI alarms or add a single Discrete Alarm block (HLLDALM) to these outputs to generate HMI alarms. Note the IEMQuality ERROR output is normally FALSE unlike the other two outputs normally TRUE when the IEM and all connections are good quality. Duplicate these function blocks for the second redundant IEM this provides 6 total alarms for the redundant IEM pair.



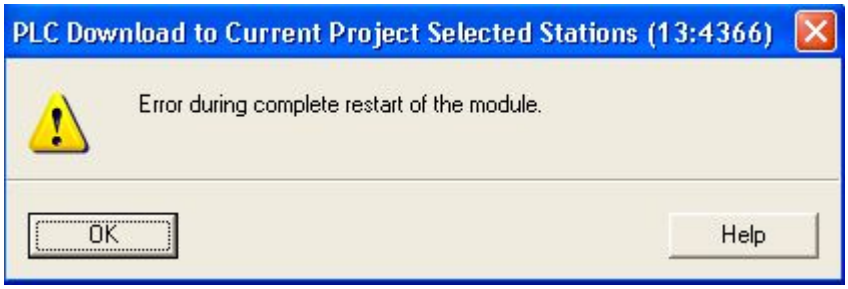

- Alternate method - In the HMI (ie.WinCC) add the two new data tags directly. This is done by adding two tags named with a connection name (from the iem2iem.txt file) used followed by .Gateway.Ethernet.Quality and .Gateway.MBI.Quality (ie. "IEM01A_IEM02A.Gateway.Ethernet.Quality" and "IEM01A_IEM02A.Gateway.MBI.Quality"). You should also do the same thing for the other redundant IEM (ie. "IEM01B_IEM02B.Gateway.Ethernet.Quality" and "IEM01B_IEM02B.Gateway.MBI.Quality"). Since the redundant IEMs share the same MBUS segment even if the Ethernet port of 1 IEM is disconnected the data tags of the disconnected IEM are still available to the HMI. If both data tags generate bad quality this would be a sign that the IEM has totally stopped functioning. These data tags can then be assigned to any objects on graphics that accept two states for visual operation and alarming as desired.

# 4 Operational Considerations on the BoxPC IEM V3.0

## 4.1 S7 Downloads

Since the BoxPC IEM 3.0 uses a newer version of Simatic Net v7.1 SP3 a new version of the IEM_PROFILE.zip is required IEM_PROFILE_v3.0.zip. A copy of the IEM_PROFILE_v3.0.zip is found on the CD under the Profile folder.

If the IEM_PROFILE_v3.0.zip is not used in your PCS7 project this error below maybe seen when downloaded to the IEM.




So if upgrading a previous Box 620, 627 or 627B to a Box 627C this new IEM_PROFILE_v3.0.zip is required.

# 5 Documentation

## 5.1 Online Documentation

Documentation for the S7 GW_SEND and GW_REC blocks is available by selecting the block in the CFC editor, and pressing **F1**.
Documentation for the APACS+/QUADLOG GW_SEND and GW_REC blocks is APACS IEM FB Help item in the **Start > APACS+ Control > Help Docs menu.**

## 5.2 Electronic Documentation

A link to the electronic documentation is on the desktop. It can be displayed and printed using Adobe Acrobat Reader.

# 6 Notes on Usage

- The document, "SIMATIC IPC627C Getting Started," in the documentation package, contains information on the physical characteristics and mounting of the IEM.

- A control system is made up of computing devices (including the IEM). These devices are susceptible to computer viruses and worms, and their network should not be attached to a corporate network, or the Internet. The control network should be isolated in order to minimize the risk or infecting the network. It is not possible to put virus software on every node in the control network. Computer media should be virus scanned before using it on any computing device on a control network.

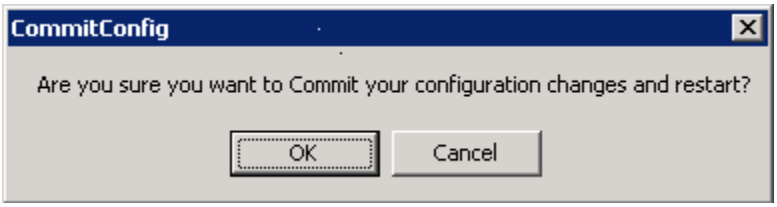
- If for some reason a virus is suspected on the IEM 3.0 the File Based Write Filter (FBWF) is enabled so a power cycle of the IEM 3.0 should remove the virus since most areas of the compact flash are not permanently written.

- It is required to power cycle the IEM to make configuration changes, thereby interrupting communication processes. The IEM will stop the communication processes in order to accept a connection download. This is needed for S7 systems to exchange data with APACS+/QUADLOG systems. Configuring an IEM on an online process can cause disruptions.

- The S7 GW_SEND block will issue an error 6, "Partner SFB/FB is in the DISABLED state (EN_R has the value of 0)", if the R_ID value is greater than the MaxR_ID configuration parameter in the IEM.

- There is a limit of 12 APACS connections. The APACS peer-to-peer service takes precedence over the APACS to S7 peer-to-peer service. This means if there are 8 configured APACS to APACS connections, and 5 APACS to S7 connections, that the IEM will use 8 APACS to APACS connections and 4 APACS to S7 connections, for a total of 12 APACS connections.

- It is not recommended, however some users modify their configuration manually in the registry or Apacs.ini file. Since the new FBWF mentioned under "What's New about BoxPC 627C IEM V3.0" will not allow direct edits to the registry or Apacs.ini file a utility has been added to the desktop of the IEM. This utility is called "CommitConfig" and must be used if manual configuration edits are made thru remote desktop. After configuration changes are made double mouse click on this utility and a message box will appear that looks like this below. If you select "OK" a few seconds later the IEM will restart, if you select "Cancel" nothing will happen. But keep in mind your configuration changes will be lost the next time the IEM is restarted.




## 7 Security Information

Siemens offers Industrial Security mechanisms for its automation and drive product portfolio in order to support the safe operation of the plant/machine. Our products are also continuously developed further with regard to Industrial Security. We therefore recommend that you keep yourself informed about updates and upgrades for our products and always use the latest version of each product. You can find information on this at: http://support.automation.siemens.com. You can register for a product-specific newsletter here.

For the safe operation of a plant/machine, however, it is also necessary to integrate the automation components into an overall Industrial Security concept for the entire plant/machine. You can find information on this at: http://www.siemens.com/industrialsecurity. Products used from other manufacturers should also be taken into account here.