

EK55MX-DC Turbo SIMPLE Module **Test Fixture**

User and Technical Manual

CONTENTS

- 1. Introduction 3
- 2. EK55MX-DC Test Fixture Contents and Collateral 4
- 3. EK55MX-DC Test Fixture Description 4
 - 3.1. Turbo DC Wall Adapter 4
 - 3.2. EK55MX-DC Baseboard 4
 - 3.3. EK55MX-DC Host Interface Module 8
- 4. Applications of EK55MX-DC Test Fixture 9
 - 4.1. EK55MX-DC as a Production Tool..... 9
 - 4.2. EK55MX-DC as an Evaluation Tool 10

1. Introduction

Intellon Corporation has developed a line of **Single Inline Module- PowerLine Enabled (SIMPLE™)** modules that allow customers to build powerline communication capability into a product with minimal use of discrete components. The Turbo SIMPLE™ Module test fixture, EK55MX-DC incorporates SIMPLE Module IC and other support circuitry to provide a single component Powerline communication (PLC) solution. The product designer takes this module and adds the required support circuitry to develop a device.

The EK55MX-DC test fixture provides capability for the evaluation of INT55MX SIMPLE™ Module functionality and performance as well as a platform for the development and evaluation of Turbo enabled devices. The baseboard provides power supply, SIMPLE Module ZIF connector, host interface module connector, and test points. Power for the test fixture is supplied from a Turbo DC Wall Adapter. The DC Wall adapter is available for both 120V and 240V environments.

The block diagram of the test fixture is shown in Figure 1.

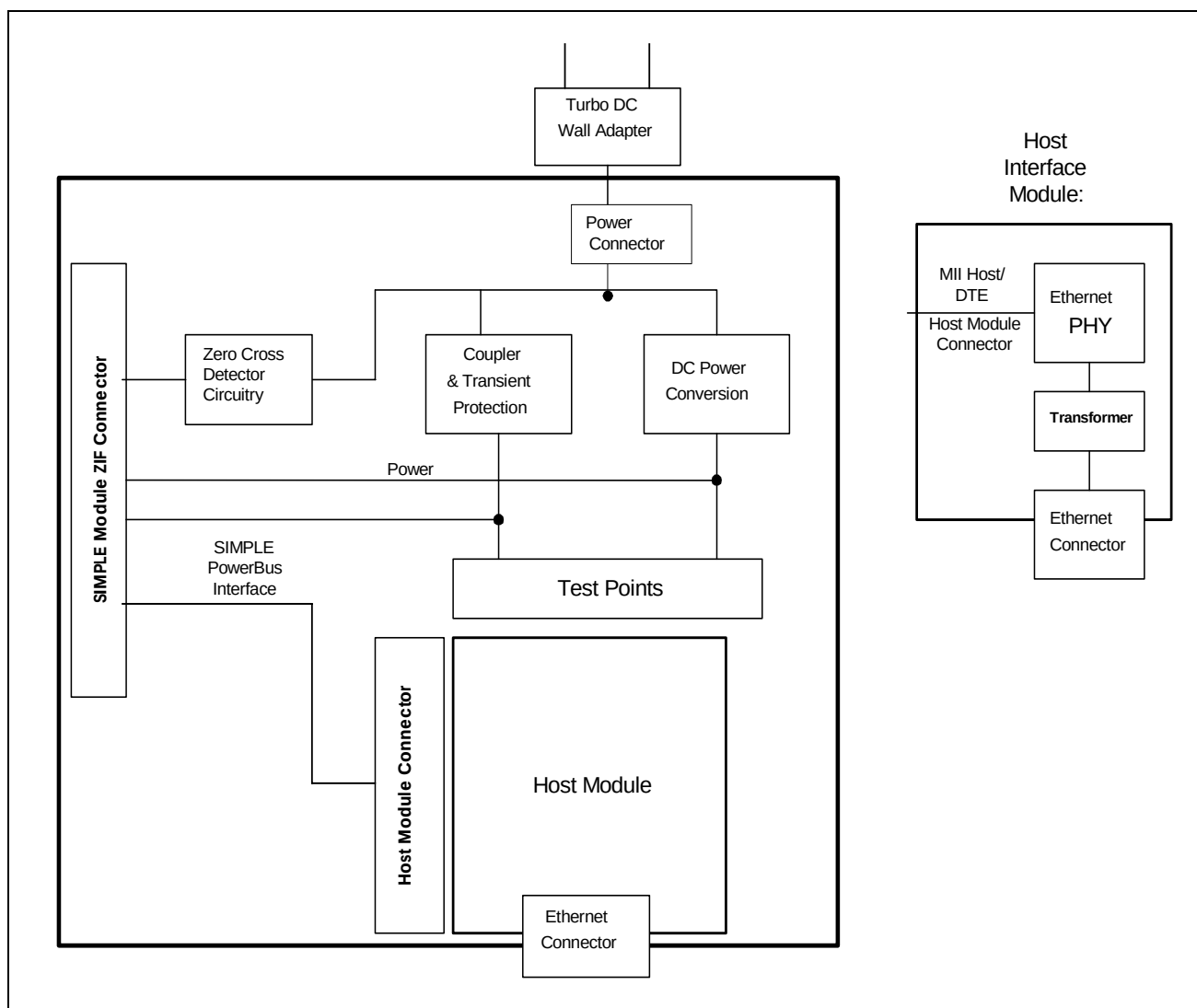


Figure 1. EK55MX-DC Test fixture Block Diagram

2. EK55MX-DC Test Fixture Contents and Collateral

The EK55MX-DC is an evaluation board that provides evaluation and development capability for the INT55MX SIMPLE Turbo Module products. Interface modules are provided with the kit for evaluation of the SIMPLE module in either of the module's two operating modes: Host/DTE and PHY. Components of the EK55MX-DC Kit are listed in the Table 1.

Table 1: EK55MX-DC Test Fixture Contents

Description	Quantity
Evaluation Kit Base Board	1
Evaluation Kit Host/ DTE Interface Module (Installed on Baseboard)	1
DC Wall Adapter (120V)	1
DC Wall Adapter (240V)	1
EK55MX-DC Collateral CD	1

3. EK55MX-DC Test Fixture Description

A block diagram of the EK55MX-DC test fixture is shown in Figure 1. The Evaluation Kit consists of the following components:

- A Turbo DC Wall Adapter
- An EK55MX-DC Baseboard
- An EK55MX-DC Host Interface Module

The following sections describe each part of the Evaluation Kit in detail.

3.1. Turbo DC Wall Adapter

The wall adapter is used to provide power, signal and the AC line zero-cross reference to the baseboard. The adapter provides 16V DC to the baseboard. Kit includes both 120V and a 240V Turbo DC wall adapter. The Turbo DC wall adapter's manufacturer information is provided below.

Manufacturer Name: Li Tai

Manufacturer Part No: 120V – PA-125-1 (15V, 4 pin Plug type - US)

240V – PA –126-1 (15V, 4 pin Plug type - EU)

Please refer to Appendix A for further details.

3.2. EK55MX-DC Baseboard

3.2.1. Block Diagram

A block diagram of the Evaluation Kit Base Board appears in Figure 1. The board incorporates a SIMPLE PowerBus socket for the INT55MX SIMPLE Module, power supply support circuitry, line coupling support, a connector for the Host interface Module, and test points for testing and debug.

a) Power Connector

A 4-pin connector is used to attach the DC Wall Adapter to the Evaluation Board. The adapter supplies 16V DC power, power line signal coupling and zero-cross reference to the board.

b) Coupler and Transient Protection

Coupling transformer and transient protection circuitry are included on the Evaluation Board to couple the PLC signal to the wall adapter and provide transient protection to the board components.

c) DC Power Conversion

Evaluation Board power is derived from the 16VDC provided by the DC wall adapter. Switching regulators are used to derive regulated 3.3V and 1.8V DC voltages for the SIMPLE and the Host Modules.

d) SIMPLE PowerBus Connector

The connector for the SIMPLE Module is a female 40-Pin header on 0.050" centers. This connector complies with Intellon SIMPLE PowerBus specification provided in the **INT55MX Technical Data Sheet**.

e) Host Module Connector

The connector for the Host Module is a male 34-Pin header on 0.10" centers. This connector provides power, MII interface and configuration signals to the Host Module. Host Module details are provided later in this document.

3.2.2. On-board Connectors Details

Connectors are provided on the EK55MX-DC Evaluation Board for Power and PLC coupling, a SIMPLE Module connector and a Host Module interface. Specific functions of these connectors are described in the following sections.

a) SIMPLE PowerBus Module Connector

Please, refer **INT55MX Technical Data Sheet** for SIMPLE PowerBus Pin description.

b) Host Interface Module Connector

The Host Interface Module for the EK55MX-DC Evaluation Board utilizes a 34-Pin header for connection to the main board. Signals available on the host interface connector are detailed in Table 2. As with the module connector, some pin functions are dependent on the state of the SIMPLE PowerBus MODE0 pin.

Table 2: EK55MX-DC Host Interface Module Connections

Pin Name	Pin #	MII PHY (MODE0 = VSS) *	MII Host/DTE (MODE0 = VDD)
VAAH	1	+16 VDC with respect to ground	+16 VDC with respect to ground
SPARE	2	Unused	Unused
KEY	3	Unused	Unused
VSS	4	Ground Reference	Ground Reference
RESET_N	5	Resets all Module logic when low.	Resets all Module logic when low.
VDDH	6	+3.3 VDC with respect to VSS	+3.3 VDC with respect to VSS
VDDH	7	+3.3 VDC with respect to VSS	+3.3 VDC with respect to VSS
MII_MDCLK	8	MII mgmt data clock (Input/Output)	MII mgmt data clock (Output)
MII_MDIO	9	MII mgmt data (Input/Output)	MII mgmt data (Input/Output)
MDI_ADRSEL2	10	MII mgmt address MSB	25MHz clock out
MDI_ADRSEL1	11	MII mgmt address LSB	No Function
VSS	12	Ground Reference	Ground Reference
MII_TXD3	13	MII Transmit Data Bit 3 (Input)	MII transmit data bit 3 (Output)
MII_TXD2	14	MII Transmit Data Bit 2 (Input)	MII transmit data bit 2 (Output)
MII_TXD1	15	MII Transmit Data Bit 1 (Input)	MII transmit data bit 1 (Output)
MII_TXD0	16	MII Transmit Data Bit 0 (Input)	MII transmit data bit 0 (Output)
MII_COL	17	MII Collision Detect (Output)	MII collision detect (Input)
MII_TXEN	18	MII Transmit Enable (Input)	Valid data appears on the MII_TXD [3:0]
MII_TXCLK	19	MII Transmit Clock (Output)	MII transmit clock (Input)
MII_TX_ER	20	MII Transmit Error (Input)	MII transmit error (Output)
NC_21	21	Unused	Unused
VSS	22	Ground Reference	Ground Reference
MII_RXER	23	MII Receive Error (Output)	MII receive error (Input)
MII_CRS	24	MII Carrier Sense Receive Enable (Output)	MII carrier sense (Input)
MII_RXCLK	25	MII Receive Clock (Output)	MII receive clock (Input)
MII_RXDV	26	MII Receive Data Valid (Output)	MII receive Data valid (Input)
MII_RXD0	27	MII Receive Data D0 (Output)	MII Receive Data D0 (Input)
MII_RXD1	28	MII Receive Data D1 (Output)	MII Receive Data D1 (Input)
MII_RXD2	29	MII Receive Data D2 (Output)	MII Receive Data D2 (Input)
MII_RXD3	30	MII Receive Data D3 (Output)	MII Receive Data D3 (Input)
MODE0	31	Mode Select Bit (Connect to VSS)	Mode select bit 0 (Tie to VDD)
MDI_SPIS_N	32	Selects SPI Mode (Input)	No Function
NC	33	Unused	Unused
VSS	34	Ground Reference	Ground Reference

PHY Mode* - The EK5500-DC kit does not include PHY Interface module. Information provided here is for customer reference only.

c) Power Supply Connector

A 4-Pin connector is used to connect the Wall Adapter to the Evaluation Board. This connector includes power as well as Powerline communication and zero-cross reference signals' connections.

3.2.3. Specifications

General specifications for the EK55MX-DC Test Fixture Board are presented in Table 4. Electrical specifications are provided in Table 5.

Table 4: EK55MX-DC Evaluation Board General Specifications

Case Dimensions	5.25" (w) x 4.6" (d) x 1.4" (h)
PC Board Dimensions	4.8" (w) x 4.25" (l)
SIMPLE Module Connector	40-Pin Single Inline Socket for 0.018" Square Pins on 0.050" Centers
Host Module Connector	34-Pin Dual-row Header on 0.1" Centers
Power Supply Source	Wall Adapter

Table 5: EK55MX-DC Evaluation Board Electrical Specifications

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply	VIN	10.0	16.0	18.0	V
Power Supply Current	IIN			800	mA
3.3V Source	VDD	3.0	3.3	3.6	V
3.3V Supply Current	IDD			400	mA
1.8V Source	VDDC	1.62	1.8	1.98	V
1.8V Supply Current	IDDC			400	mA
Operating Temperature	TA	0		+60	°C

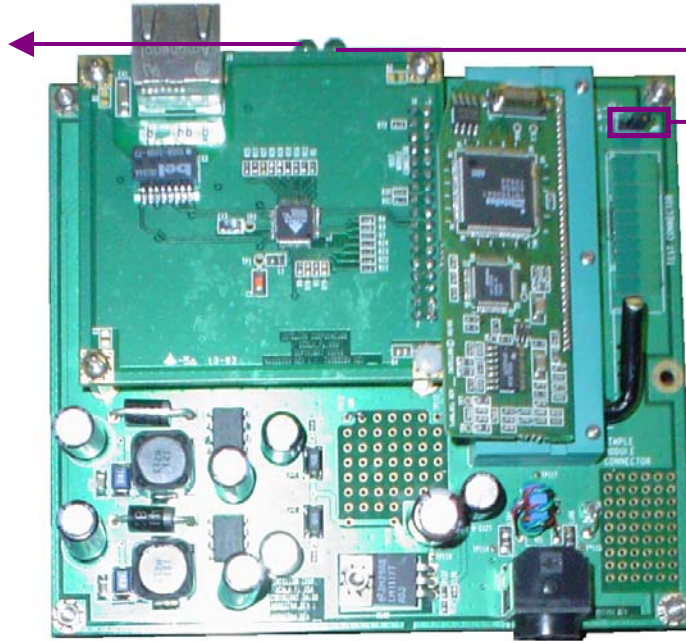
3.2.4. Jumper Setting

The Jumper setting shown in Figure 2 does not have any functionality with the current design of the DC Fixture board.

3.2.5. LED's Functionality

Table 6 provides detailed information regarding the various functions indicated by the LEDs present in the baseboard. Figure 2 clearly shows the placement of the LEDs' on the baseboard.

LED 2: PL
Link /Activity



LED 1: Turbo
status

Jumper
connection

Figure 2. EK55MX-DC baseboard

Table 6. LEDs Functionality

Red LED – Power ON - The device is turned ON. OFF - The device is turned OFF.
Green LED 1 – Turbo status ON – Indicates another Turbo device on the same powerline network. OFF- Indicates that no Turbo device is present on the same powerline network.
Green LED 2 - PL Link/Act ON - Indicates powerline connectivity. Blinking – Indicates powerline activity, transmit or receive. OFF – Device is in reset or it is not connected to the powerline network.

3.3. EK55MX-DC Host Interface Module

Physical specification of the module operating in Host/DTE mode is provided in Table 7. A description of this module is included with the kit that is provided in the following sections.

Note: Customers may build custom Host Interface Modules to meet special host application requirements. These modules may use either Host/DTE or PHY mode of operation.

Table 7: EK55MX-DC Evaluation Board Host Interface Module Physical Specifications

Specification	Value
PC Board Dimensions	2.6" (w) x 2.8" (l)
Host Interface Board Connector	34-Pin Dual-row Header on 0.1" Centers

The Host/DTE Host Module provides the function of an Ethernet PHY interface to the SIMPLE Module. The module uses the MII signals from the 34-Pin interface connector in Host/DTE mode. The module ties the SIMPLE Module "MODE0" line to VDD to configure the SIMPLE module for operation in this mode.

An Altima PHY chip, AC101L, is used to perform PHY functions. Ethernet connection to the host module is by means of a standard RJ-45 connector.

4. Applications of EK55MX-DC Test Fixture

EK55MX-DC test fixture is a tool to provide powerline communications capability to the customer's existing product. The EK55MX-DC Kit with Intellon Production Test System can be used to perform production testing of the SIMPLE module. The following sections will provide an overview about the different applications of the evaluation kit.

4.1. EK55MX-DC as a Production Tool

Production testing of the SIMPLE module can be performed using the Intellon Production Test System and components of the Evaluation Kit. Details of the testing procedure are provided below.

- a. Plug the host interface module, e.g. Host/ DTE, into host interface module connector. Figure 3 shows the EK55MX-DC baseboard with host interface and SIMPLE module.

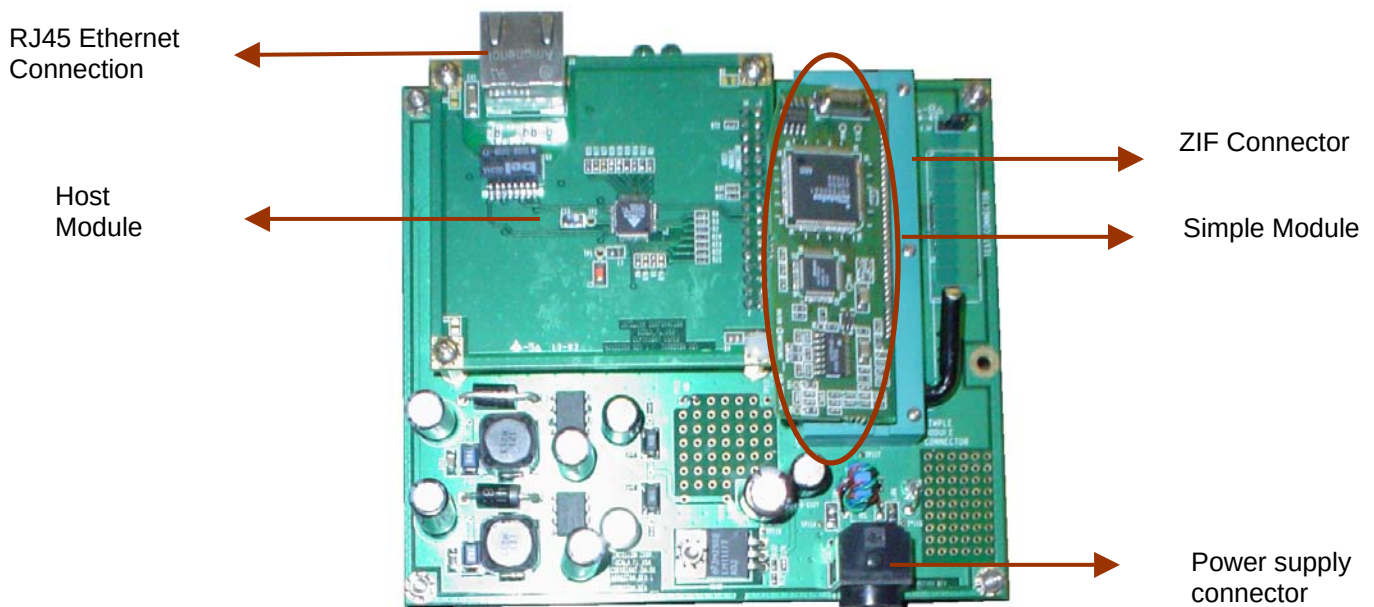


Figure 3. EK55MX-DC Baseboard with Host Module

- b. Insert the device under test (DUT) INT55MX SIMPLE module into the ZIF adapter.
- c. Connect the host interface module with the PTS Control PC's NIC card.
- d. Connect the DC wall adapter to the PTS system and power up the DC test fixture board.
- e. Connect the Ethernet cable from the PTS device to the Ethernet connection port of the board.
- f. Arrange the test setup as shown in the Figure 4. Refer to PTS5500 Installation and User Guide, 24002845 for further details.



Figure 4. Connection of the EK55MX-DC with the PTS

4.2. EK55MX-DC as an Evaluation Tool

The EK55MX-DC provides a platform for development and evaluation of HomePlug with Turbo enabled devices. The EK55MX-DC contains power supply, PLC coupling, SIMPLE module connector, connector to insert a Host module, test points to debug and a connector to accept SIMPLE module. HomePlug with Turbo functionalities can be incorporated into any existing products by using these components. Further debugging and testing could also be performed in device different operating modes. Customers can also use the perforated areas, as shown in the following figure, on the main board to test and debug different power supply, coupling and digital interface options.

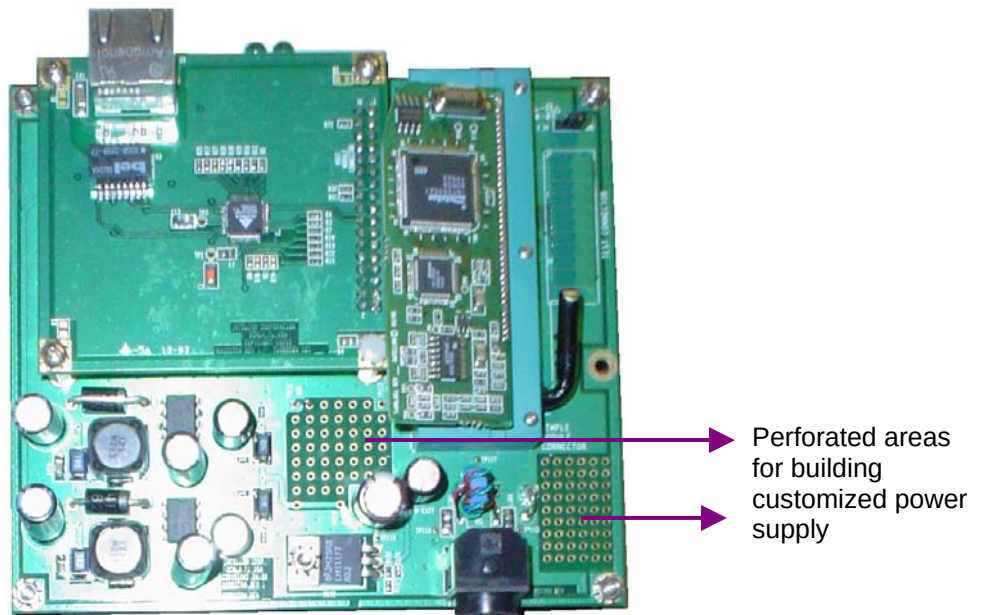
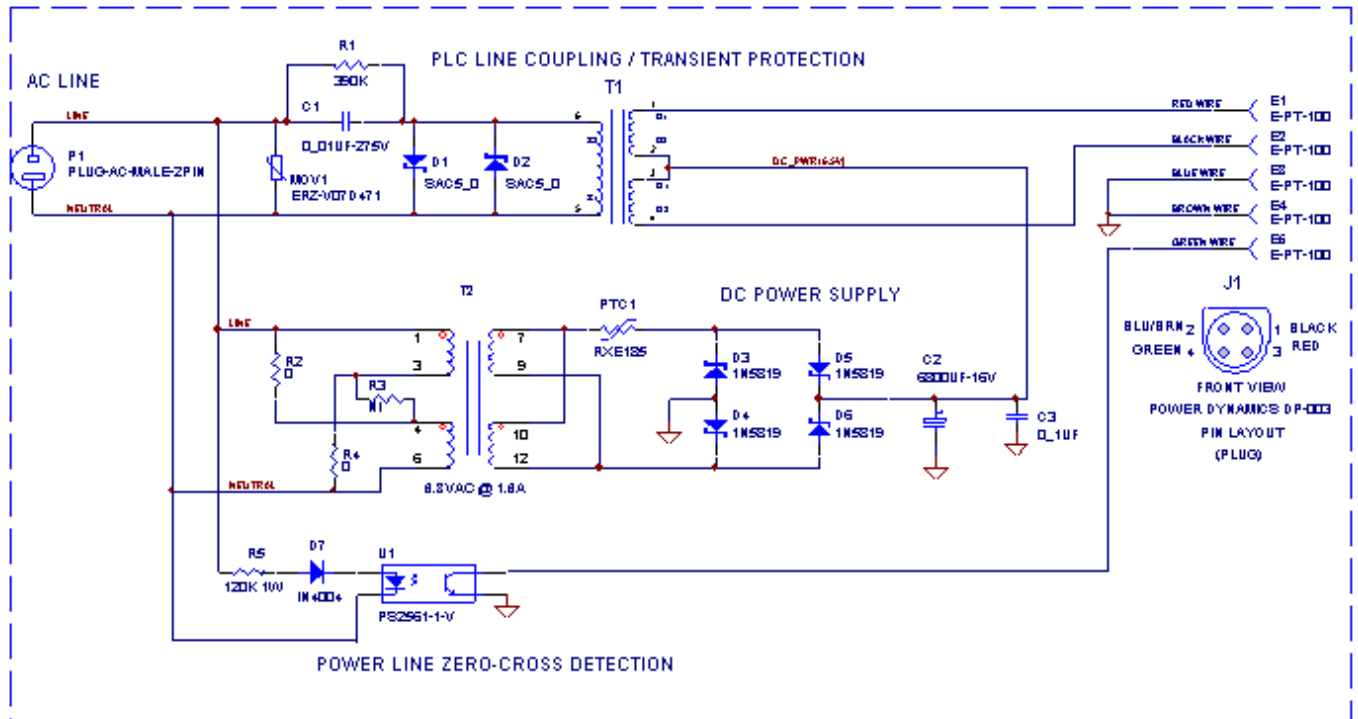
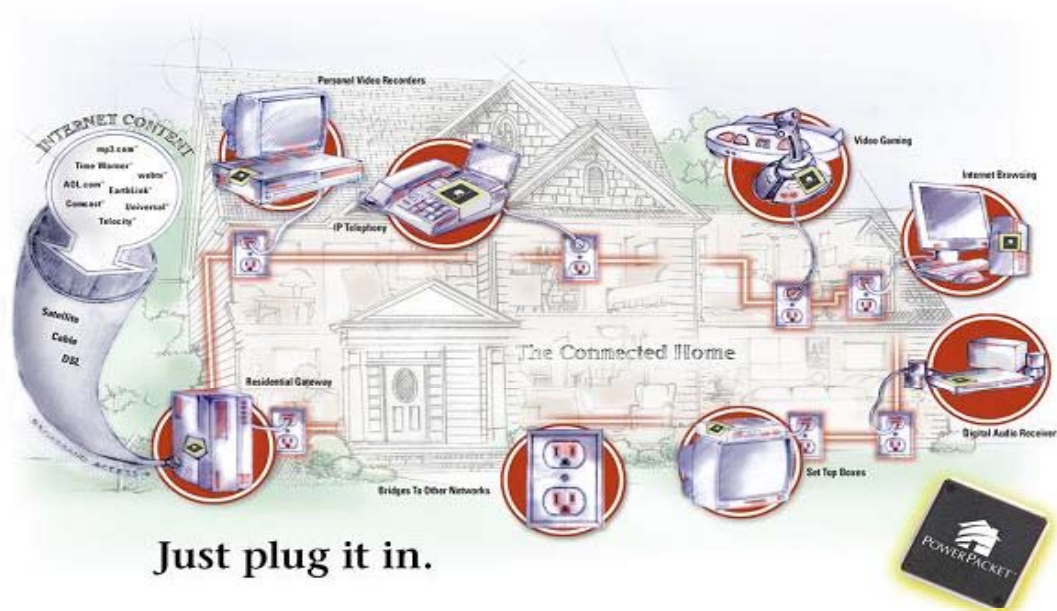


Figure 5. EK55MX-DC Baseboard without Host Module

Appendix A

DC Wall Adapter Schematic





5100 West Silver Springs Blvd.
Ocala, FL 34482
(352) 237-7416
(352) 237-7616 (Fax)

San Jose Office

1731 Technology Dr., Ste 560
San Jose, CA 95110
(408) 501-0320
(408) 501-0323 (Fax)

Toronto Office

144 Front Street West, Suite 600
Toronto, Ontario M5J 2L7
CANADA
(416) 217-0451
(416) 217-0459 (fax)

www.intellon.com



SPONSOR and MEMBER



Intellon: The World Leader in Powerline Networking

- ✓ Leading contributor to HomePlug AV specification
- ✓ Patented technology chosen as the basis for HomePlug 1.0
- ✓ Complete HomePlug 1.0 and AV solutions from a single supplier
- ✓ World leader in HomePlug IC sales and product enablement
- ✓ Over 5 million power-line ICs shipped
- ✓ Most real-world experience in power-line networking

©2005 Intellon Corporation. Intellon Corporation reserves the right to make changes to this document without notice. Intellon Corporation makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. Intellon Corporation assumes no liability arising out of the application or use of any product or circuit. Intellon Corporation specifically disclaims any and all liability, including without limitation consequential or incidental damages.

Intellon, No New Wires, SIMPLE, and SIMPLE PowerBus are registered trademarks of Intellon Corporation. HomePlug is a registered trademark of the HomePlug Powerline Alliance. All other trademarks are the property of their respective owners.