Holley Electric Energy Integrated Information Management Automation System (IMAS)

“POWER YOUR LIFE”
Part1.  Company Introduction

Part2.  Holley Electric Energy IMAS Overview

Part3.  HL3440 Residential PLC AMR System

Part4.  HL3200 Large-scale Consumer (C&I) Wireless Network AMR System (IMAS)

Including:
HL3201 Master Station System
HL3202 Data Acquisition Terminal
<table>
<thead>
<tr>
<th>Company</th>
<th>Holley Group</th>
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<tr>
<td>Business Domain</td>
<td>Electricity Meter and AMR System, Low Voltage Electric Products, and Others</td>
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<td>Established Year</td>
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<td>Overseas Factories &amp; Companies</td>
<td>Thailand, Argentina, India, Nigeria, Hong Kong, Philippine, etc.</td>
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<td>HQ Address</td>
<td>No.501 Moganshan Rd. Hangzhou 310005, P.R.China</td>
</tr>
<tr>
<td>Web Site</td>
<td><a href="http://www.holleytrade.com">www.holleytrade.com</a>  <a href="http://www.holley.cn">www.holley.cn</a></td>
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Holley Group Highlights

- Holding 4 publicly listed companies (3 domestic ones and 1 NASDAQ)
- Listed as “Top500 Enterprises” in China
- Chairman Wang Licheng win the “Fortune 2001” Chinese Businessman
- Holley Electricity Meter awarded as “China Top Brand” products and ranked 1st in China for 12 continuous years
- In the year 2004, Holley’s total sales revenue exceeds 10 billion RMB.
- Holley’s C&I AMR terminal certified No.1 in Zhejiang Provincial Electrical Company’s official performance test (10 most famous brand tested)
- Obtained the Certificate for Product Exemption From Quality Surveillance Inspection in China
Holley International Co., Ltd. (Hangzhou-Headquarter)
- Holley South Electronic Technology Co., Ltd (Shenzhen, R&D and Manufactory)
- Holley (Thailand) Electric Co., Ltd
- Holley Energy S.A (Argentina)
- European strategic partner: Enermet (Finland)

Holley Technology Co., Ltd.
- System & Electronic Products Engineering R&D Center (AMR Department)
- System Automation Dept. (SCADA/EMS/DMS)
- Distribution Automation Department
- GIS Department

Holley Metering Ltd. (China top brand meter and No1 selling in China)
- Zhejiang Holley Electric Technology Co., Ltd (Meter Manufactory)
- Hangzhou Holley Metering Flux Technology Co., Ltd (water, gas meters)
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Including:
- HL3201 Master Station System
- HL3202 Data Acquisition Terminal
• Holley Electric Energy IMAS (AMRS) provides advanced and efficient energy management solutions for all kinds of energy markets.

• Holley Electric Energy IMAS offers most advanced and comprehensive functions such as integrated automatic metering, power analysis, power network monitoring, load control, etc. It also has easy and powerful interface to connect database and other applications as MIS, SCADA.

• We provide you end-to-end solution from all kinds of meters, terminals, concentrators and application software to the utility back office. Our successful experience in domestic market made us the best solution provider in China.
Holley IMAS Overview

- Database Server
- Computering Server
- Gateway
- Front-End Server 1 -- Front-End Server N
- Web Service & Application Server

Communication Protocols:
- PSTN
- Ethernet
- GPRS
- GSM
- SMS

- Substation Terminal
  - 3-Phase Multi-Functional Meter for Substation
  - RS-485 Bus

- Large-Scale Consumer
  - Terminal for Large-Scale Consumer

- Distribution Transformer and other Consumer
  - GPRS 3-Phase Multi-Functional Meter
    - GPRS 3-Phase Multi-Functional Meter for Distribution Transformers

- Distribution Transformer and Residential
  - Concentrator
    - RS-485 / RF / PLC
  - Meters with Pulse Output + Converter

Common User
Power Supply Utility's Workstations

www.holleytrade.com
Structure of Holley Integrated IMAS

- Power Plant / Substation / Grid Gateway
  - HL3100 IMAS System
    - Data Acquisition Terminals
- Large-Scale Consumer Transformer
  - HL3200/HL3300 IMAS System
    - Large-Scale Consumer Terminals + Meters
- Residential Consumer
  - HL3400 IMAS System
    - Integrated Terminals + 1-Phase/3-Phase Meters

*www.holleytrade.com*
HL3000 Electric Energy IMAS Layers

Power Plant, Substation

Large-Scale Consumer, Distribution Transformer

Residential

HL3100 Substation Electric Energy Metering & Billing IMAS

HL3200 Large-Scale Consumer Electric Energy IMAS
HL3300 Distribution Network IMAS

HL3400 Residential Electric Energy IMAS

HL3000 Electric Energy IMAS Platform
Advantages of Holley Integrated IMAS

- Avoid repeated construction, Improve economic benefit
- Information sharing covers all scopes and layers. Global management including transmission, distribution, low-voltage and line-loss becomes much easier and reliable
- Adapt mechanism of electric power utility, reduce cost and improve efficiency for power enterprises
- Greatly save authorities’ lost by supervising and punishing electricity fraud and tempering
- Integrate existing systems (SCADA/MIS/EMS) and extend functions
- Emphasize electric power market management with various application interface and data compatibility
- Perfect and powerful system functions (AMR/RC/supervision/terminal live update)
- Support various of communication method (PSTN/GPRS/GSM/RF/Infrared)
Integrative System Application Platform

Integrated Output Platform
(Business Interface/ Graphics/ Report Forms/ Web Browse/ GIS)

Metering Application Platform
(System Maintenance/ Metering Stat.)

Special Application Platform
(Line-loss Analysis/ Assess/ Settlement/ Billing)

Transformer Substation Application system

Large-scale consumer/ Distribution transformer Application system

Residential Application system

Distributed Application Software Platform
(Electric Network Model/ Data Collection/ Database/ Network/ Warning System)
Part1. Company Introduction

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Including:
- HL3201 Master Station System
- HL3202 Data Acquisition Terminal
Main Features and Benefits

Metering data management
• State-of-art-PLC technology, using reliable and robust two way communication
• 99.90% reading data (daily), interval meter data (from 15-30mint)
• Anti-interference ability
• Historical data retrieval, backup data when power outage (many years)
• Remote parameters and network configuration download

Flexible tariff (T.O.U) management
Detection and control function
• Loss and fraud detection (power theft)
• Remote connect and disconnect
• Power failure alarm annunciation

Consumption profile management
• ‘Real time’ data presentation, Web-based access
• Data base management
• Demand power management
HL3440 Residential PLC AMR System (since year 1996)

Key Technology
1) Spread Spectrum (SS) + DSP (e.g. data compress)
2) f1, f2 hopping technique
3) GAC function
4) With build in PLC module
5) Data reading guaranteed: 99.9% (daily).
Meters
DDSI 28 Single-phase electronic PLC meter
DDSI 28(L) Single-phase PLC meter (with control function)
DDSIF 284 Single-phase electronic PLC TOU meter
DDSIF 284(L) Single-phase PLC TOU meter (with control function)
DDS28u Single Phase Multi-function PLC Meter
DTSI  541 3P4W electronic PLC meter
DTSD545 3P4W multi-function meter (for master meter)

AMR Components
CZX040-2m(c) Data collector (or with control function)
CZL040-3c(c) 4-channels data collector (or with control function)
CZL040-5c RS485/PLC data collector/converter
CGZ040-1j(c) Data concentrator (Gateway)
CH040(c)-TP650 Hand Hold Unit (programmable)
CZZ040-Rep Synchronization Repeater
HL3440 S/W AMR system application software
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Wireless Network AMR System (IMAS)

Including:
- HL3201 Master Station System
- HL3202 Data Acquisition Terminal
HL3200 Large-Consumer (C&I) System-Structure

- System Server (MIS / Power Load Control System)
- Maintenance/Supervisory Workstation
- Business/Report Forms Workstation
- Collector Server
- GPS Satellite Clock
- Terminal Server
- GSM Modem Pool

Master Station of Large-Scale Consumer System

GSM / GPRS Network

Large-Scale Consumer Terminal

Distribution Transformer

Large-Scale Consumer Terminal
Data Acquisition → energy consumption, voltage of each phase/currency/power/power factor, demand, etc.

Data Statistic → statistic of consumption, voltage yield, voltage reliability, etc.

Working Condition Supervision & Analysis → power quality supervision; line loss analysis; power load analysis

Load Control → auto power off/on according to threshold

Abnormal Supervision & Alert → event of voltage loss, open phase, reversed phase; abnormal CT status, electricity larceny, etc.

Auto Create Chart, Curve, Report and support WEB Browsing

Database Sharing with other Electricity Applications (MIS/EMS/SCADA)
4 Kinds of Terminals are available for different requirement:

A. Meter Reading Only: reading & uplink to master station
B. [A] + Telesignalization, Telemetering and Telecommand
C. [B] + Abnormity Supervision & Alert
D. [C] + Energy Quality Supervision
HL3202 Data Acquisition Terminal

Data Specification:

- Power supply: AC 220V±20%, f= 45~55Hz;
- Baud rate: 0.3~5.6kbps(uplink)/1.2~9.6kbps(downlink);
- Remote connect/disconnect, theft protection;
- Interface with RS 232/485, GSM/SMS, GPRS, CDMA;
- Power outage management, etc....
HL3202 Data Acquisition Terminal - Functions

◆ Automatic Meter Reading (AMR)
  ◇ Real-time/scheduled reading all data from meters ◇ Reading by relay

◆ Data Preservation
  ◇ Max records saving number (I-Task Interval)
    I=minute: 9000;  I=hour: 1000;  I=day: 180;  I=month: 30
    Relay Task: 400;  Event Log: 100

◆ Supervision
  ◇ Fraud and tamper alarm ◇ Power supply quality alarm ◇ Meter status alarm
    ◇ Service alarm ◇ Remote control alarm

◆ Remote Switch Control
  ◇ Power ◇ Electric quantity

◆ Remote Live Update

◆ Data Compression
  ◇ Based on LZ78 arithmetic
  ◇ Ave. Compression Ratio > 50%
Hardware
Industrial standard chips (Motorola DSP) provide best EMC, lightning-proof, anti-jamming ability and extreme environment adaptability

Software
Adopting uC/OS-II embedded RTOS in module to ensure:
◇ real-time task execution
◇ simplify multitask switch, resource distribution and network message management
◇ modularization easier for software expanding, transplantation and reuse
◇ improve program reliability
System capacity: terminal < 1000, metering points < 5000;
Accuracy of data: as meter;
BER: < 10^-4;
Mean time between failure (MTBF): > 50000h;
System efficiency: 99.9%;
Line-losses management;
System integration;

.....
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CASE – THAILAND C/I WIRELESS AMR SYSTEM
## CASE – THAILAND C/I WIRELESS AMR SYSTEM

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CASE - THAILAND C/I WIRELESS AMR SYSTEM
Smart Meter With AMR Functions
Meter with GSM/GPRS/CDMA
• PLC AMR With Mesh Topology Technology
  Topo-relay, Intelligent dynamic repeater/relay

• Zigbee Wireless AMR System
  (Holley and Ember partnership, signed MOU)
Zigbee wireless network AMR system
Thank You!

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[www.holley.it](http://www.holley.it)