eZDSK.91C111 Technical Data Sheet

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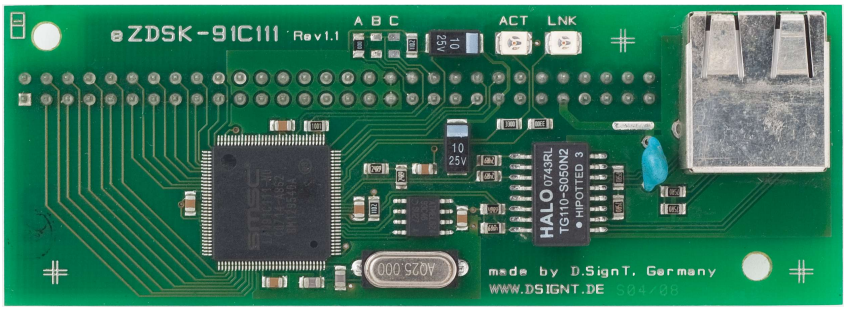
SUMMARY

- **Ethernet Daughter Card for eZdsp™ F2812 and eZdsp™ F28335**
- **Dual Speed 10/100 Mbit Ethernet Media Access Controller**
- **Fully integrated IEEE 802.3/802.3u 100Base-Tx/10Base-T Physical layer**
- **Auto negotiation: 10/100, Full/ Half duplex**
- **Optimized TCP/IP Protocol Stack, does not require a RTOS, but can run as a DSP/BIOS task**
- **Supported protocols: ARP, UDP, TCP, ICMP, DHCP, DNS, HTTP, FTP, SNTP, SMTP, TELNET**
- **Glueless Interface**



General Description

The eZdsk.91C111 is a networking peripheral daughter card for the Spectrum Digital eZdsp™ TMS320F2812 and TMS320F28335 development kits. It extends your DSP system with an industry standard 100Base TX /10Base-T Ethernet interface for distributed control applications, networking, web-based remote configuration and maintenance, and a high speed link for realtime data visualization.

TCP/IP software protocol stack is available, which has been carefully optimized for the special memory and real-time constraints of DSP systems. No underlying real-time operating system is required to integrate the TCP/IP protocol into your DSP system, however, the TCP/IP stack will also run on DSP/BIOS.

The DS.eZdsk.91C111 includes a single-user development license for the TCP/IP software library. OEM licenses are available too.

The TCP/IP object code library has carefully been tailored to meet the constraints of a DSP system. Code and data memory size have been minimized, and no additional resources like DSP interrupts or timers are required.

The TCP/IP protocol stack can be used in a 'linear' C program, just as running as a task in DSP/BIOS. The protocol stack supports the following protocols:

- ARP - Address Resolution Protocol, resolves the IP address to a hardware MAC address. No user-action is required. If an address is unknown, an ARP request is generated automatically.
- IP - Internet Protocol. All data transferred by DNS, DHCP, ICMP, UDP and TCP is automatically packed into IP packets.
- ICMP - Internet Control Message Protocol. The protocol stack for the DSK91C111 responds to "ping" requests to test a connection.
- UDP - User Datagram Protocol. UDP provides a one-to-one or one-to-many connectionless data path. Data transmitted via UDP is not guaranteed to reach it's destination. This protocol has very low overhead and is especially useful for transmitting non-critical data like audio and video data.
- TCP - Transmission Control Protocol, provides reliable, connection-oriented, one-to-one connections. All data is acknowledged by the receiver and re-transmitted automatically if required. This protocol should be used for critical data like software uploads, commands, etc.

- DHCP - Dynamic Host Configuration Protocol. This protocol has been developed to ease maintenance of a TCP/IP network. A DHCP server manages the allocation of IP addresses and provides additional network configuration data like gateways, DNS servers etc. The TCP/IP stack integrates the client functions required to obtain an IP address, DNS server, and gateway.
- DNS - Domain Name System. This protocol allows to use symbolic host names instead of numerical IP addresses. The TCP/IP stack integrates the client functions to query a DNS server to resolve a host name.

The TCP/IP stack has been designed to keep code size to a minimum. Only those protocol functions required in your system will be linked to your application.

Higher level protocols like SMTP, HTTP or FTP are based on the described protocols, most of them using TCP. The TCP/IP library includes a ready-to-use FTP server, which allows to upload programs and parameters to the DSK Flash Memory, or download log files and data from the DSK. The FTP server is widely configurable: users, passwords, directories files, and access restrictions are maintained in a simple data structure. A HTTP server framework is also provided. This framework handles multiple connections and passes GET and POST parameters to a user-defined callback function, hence providing the required flexibility for dynamic data. The DSP can send static HTML pages and images as well as inserting the current value of variables, generate images from data acquisition buffers, etc. on demand. Finally, basic SMTP functionality is provided to send an e-mail, e.g. to periodically send log-files to the system administrator.

The TCP/IP software uses a socket architecture, similar to the familiar Berkeley sockets. Following is a description of the function calls implemented:

General Initialization

net_init()	initialize sockets
net_set_gateway()	configure gateway for connections outside the local IP net.

Socket Configuration

socket_open()	open a new socket
socket close()	close a socket
set_socket_option()	specify non-standard socket options, e.g. disable UDP checksum
socekt_define_callback()	install a user-defined callback function
install_icmp_socket()	install a socket and buffer for 'pings'

Send Functions

net_send()	non-blocking send function
net_send_string()	blocking send function for strings
net_send_ready()	blocking send function for binary

Receive Functions

net_recv()	non-blocking receive function
net_revc_ready()	blocking receive function

Miscellaneous Functions

net_isq()	main network polling function, must be called periodically in your program's main loop or from a periodic task.

TCP Connection Functions

connect ()	establish a connections
shutdown ()	shutdown a connection
gethostbyname()	host name resolution
accept()	test if TCP socket is connected

This example demonstrates how to program a UDP echo server to retransmit all data received on port 7:

```
#define ECHO_PORT      7
#define HOST_IP        ANY_IP
#define HOST_PORT      ANY_PORT
#define MAX_ECHO_SIZE  1024

char udp_echo_buffer[MAX_ECHO_SIZE];

net_init();
udp_echo_socket = socket_open (HOST_IP, HOST_PORT, ECHO_PORT, IPT_UDP, DATATYPE_CHAR);

/*******************************************************************************
  main program loop
*******************************************************************************/
for (;;)
{
    /*******************************************************************************
      signal processing
    *******************************************************************************/
    ...

    /*******************************************************************************
      network polling function
    *******************************************************************************/
    net_isq();

    /*******************************************************************************
      UDP echo
    *******************************************************************************/
    if (len = net_recv (udp_echo_socket, udp_echo_buffer, MAX_ECHO_SIZE))
    {
        net_send (udp_echo_socket, udp_echo_buffer, len);
    }
}
```

Hardware

Currently the following eZdsp boards are supported:

Product Description	TI Part No	Spectrum Part No
TMS320F2812 eZdsp Kit	TMDSEZD2812	761128
TMS320F2812 eZdsp Kit (DSP in Socket)	TMDSEZS2812	761129
TMS320F28335 eZdsp Kit	TMDSEZ28335	761135
TMS320F28335 eZdsp Kit (DSP in Socket)		

Electrical and Mechanical Characteristics

- Data Bus Interface: 16 bit wide
- Chip Select: Zone 0,1 or 2 configurable via solder link
- Ethernet Interface: IEEE 802.3/802.3u 100Base-TX / 10Base-T, RJ-45 connector
- LEDs: Link and Activity
- Power Supply: 3.3V / 100 mA typ, 150 mA max.,
  supplied from DSK via daughter card connector
- Operating Temperature: 0 to +70°C
- Size: 99 x 36.5 x 27 mm

ORDER INFORMATION

DS.eZdsk91C111	Ethernet daughter card base package, including: - daughter card - single-user test and development license for TCP/IP library - object code library for TCP/IP - documentation - sample software in C-source code (UDP and TCP echo, FTP, HTTP, SMTP)
OL.eZdsk.91C111	OEM license for TCP/IP library, no limitations or royalties, includes schematics and hardware documentation to integrate the Ethernet LAN hardware into your production system.
eZdsk91C111	daughter card only
QL.eZdsk91C111	TCP/IP Software quantitiy license for 10 prototype units

ADDITIONAL OPTIONS ON VOLUME PURCHASE

For volume purchase D.SignT offers customer specific modifications of the hardware either to reduce costs through reduced functionality or to increase functionality to meet the customers application requirements. Extensive experience in custom designs and the powerful engineering tools of our development department bring your application and our DSP know how together for your solution. Please contact D.SignT directly.

TECHNICAL SUPPORT

Our products include free of charge technical support. You can reach the technical support by e-mail (support@dsignt.de) phone or fax.

PRICING

Please ask for our current price list and volume discounts.

AVAILABLITY

Our standard products are typically available ex-stock. For special modifications or non-standard products please consult our sales department.

WARRANTY

All D.SignT products come with a 12 month warranty.

For additional information contact your local distributor who will also support you after your purchase or contact D.SignT directly.

Distributed and supported locally by

D.SignT GmbH & Co. KG
phone: +49 (0) 2833 / 570977 • fax: +49 (0) 2833 / 3328
mail: info@dsignt.de • web: www.dsignt.de
Marktstraße 10 • 47647 Kerken • Germany