DIGITAL KEY TELEPHONE SYSTEM
SERVICE MANUAL

MODEL : ipLDK-60

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SECTION 1. General Description

This manual is intended to provide a full understanding of the architecture, operation, and circuits employed in LG-NORTEL's Digital Key Telephone system, ipLDK-60. It is intended for use as an aid in training installation and maintenance personnel. Also, in conjunction with circuit schematics, this document is intended for use in support of component level repair by authorized LG-NORTEL repair facilities. The ipLDK-60 is a fully digital switching system which is intended for small or medium sized business office.

The ipLDK-60 system incorporates state-of-the-art digital technology for command processing and voice switching, utilizing a Pulse Code Modulation/Time Division Multiplexing (PCM/TDM) distributed switching matrix. The system supports "A" law voice encoding rule based on the requirements of local regulations.

The ipLDK-60 system achieves a high level flexibility by 1) employing three kinds of option boards, and 2) providing expansion system.

The KSU of ipLDK-60 is a wall-mounted cabinet that houses the MBU (Main Board Unit) and several connectors for the CO line/Digital KTU/SLT/Voice mail/LAN interface boards, and other useful boards.

1.1 System Connection Diagram

ipLDK-60 system can be connected to several externals and internal line for call processing as following Figure1.1.1 System connection diagram.

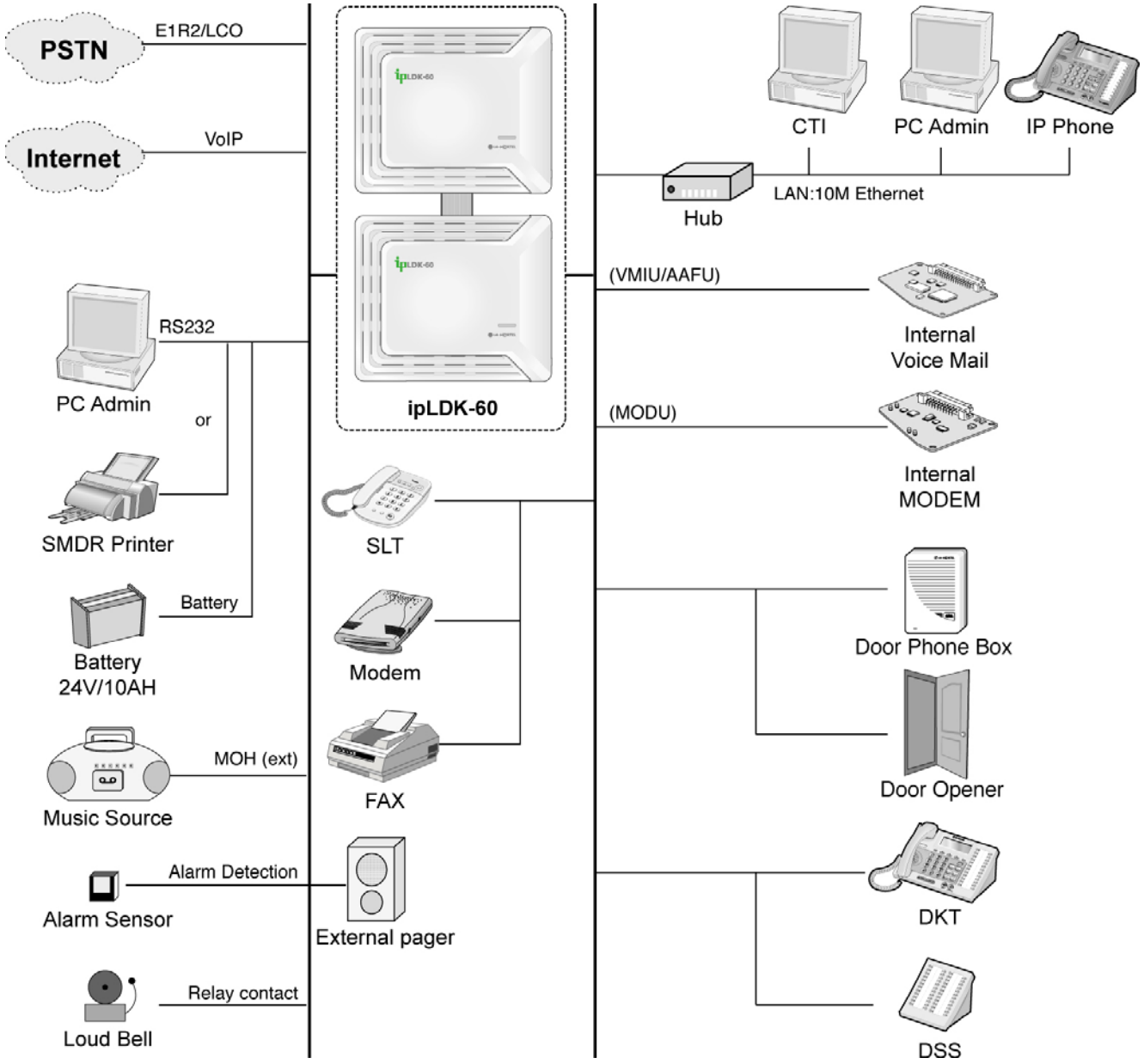


Figure 1.1.1 System Connection (ipLDK-60)

1.2 Special attention of notice

1. Make sure that the power is off and start disassembling the system and board.
2. When dealing with PCB, check the discharge of human body and deal it with the edge of PCB.
3. When changing electric parts (IC, Capacitor or Etc.) and connecting the ring signal, be sure not to touch the lead wire.
4. When assembling KSU, check the screw.
5. When assembling KSU, check the cable connection.
6. When connecting the external battery, check the polarity of batteries.
7. When assembling KSU, check the connection of protection parts and earth ground.

1.3 System Features

1. Flexible architecture
2. Simplifying system structure
3. Powerful PC application via LAN, Modem, RS-232C
4. Stable & Enhanced voice features
5. Simple installation & efficient system management
   - Remote admin & software upgrade through LAN connection
   - Remote admin & software upgrade through PSTN modem
6. Value-Added features
   - Distinctive voice mail Quality (ADPCM 32 Kbps)
   - Basic CID (CO & SLT) Function
   - 8 Poly internal MOH (13 Music sources)

1.4 System Specifications

1.4.1 General specifications

ITEM	DESCRIPTION	SPECIFICATION
CPU		ARM9 TDMI core(32bit, 50MHz)
Switching Device		Custom Mixed-Signal ASIC Device
Memory Back-up Duration		10years
PSU	AC Voltage Input	100~230 +/- 10% Volt AC @47-63Hz
	AC Power consumption	90W
	AC Input Fuse	2A @250Volt AC
	DC Output Voltage	+5, -5, +27, +30Volt DC
External Backup Battery	Input Voltage	+24 Volt DC(+12VDC x 2ea)
	Battery Fuse	5.0A @250Volt AC
	Charging Current	Max. 200mA
	Battery Load Current	Max. 3A
Ring Signal		75Vrms, 25Hz
External Relay Contact		1A @30Volt DC
Music Source Input		0dBm @600ohm
External Paging Port		0dBm @600ohm
Ring Detect Sensitivity		30Vrms @16-55Hz
DTMF Dialing	Frequency Deviation	Less than +/-1.8%
	Signal Rise Time	5ms
	Tone Duration, on time	Min. 50 ms, Normally 100ms
	Inter-digit Time	Min. 30ms, Normally 100ms
Pulse Dialing	Pulse Rate	10PPS
	Break/Make Ratio	60/40% or 66/33%
Operating Environment	Temperature	0 (^{o}C) – 40 (^{o}C)
	Humidity	0 - 80% (non-condensing)
Dimension	KSU	339mm(W) x 288mm(H) x 85mm(D)
	Expansion KSU	339mm(W) x 288mm(H) x 85mm(D)
Weight	KSU	1.8Kg
	Expansion KSU	1.8Kg
MODU	Analog Modem	Bell, ITU-T, V.34 V.32BIS, V.90
	Speed	300bps up to 33Kbps speed rate
	Connection	Automatic rate negotiation
VOIB	LAN Interface	10/100 Base-T Ethernet (IEEE 802.3)
	Speed	10/100 Mbps (Auto-Negotiation)
	Duplex	Half Duplex or Full Duplex (Auto-Negotiation)
	VOIP Protocol	H.323 Revision 2
	Voice Compression	G.711/G.726/G729/G.723.1
	Voice/Fax Switching	T.38
	Echo cancellation	G.165

1.4.2 Environment Specification

ITEM	DEGREES (℃)	DEGREES (℉)
Operation Temperature	0~40	32~104
Optimum Operation Temperature	20~26	68~78
Storage Temperature	10~70	32~158
Relative Humidity	0~80% non-condensed	

1.4.3 System Capacity

DESCRIPTION	CAPACITY/BOARD	TOTAL
Time Slots		128
CO Line Ports	3/MBU, 3/EMBU, 3/CHB308, 3/CSB316, 8/VOIB, 30/E1HB8	Max. 36
Max Direct Station (DKT, SLT, DSS) Connections	8/MBU, 8/EMBU, 8/CHB308, 16/CSB316, 8/VOIB, 8/E1HB8	Max. 48
Max. Door	2/MBU, 2/EMBU	4
LAN	MBU, VOIB, E1HB8	3
MODEM Channel	1/MODU	1
Attendant Positions	5/System	
Intercom Links	Non-Blocking	
Paging - All Call - Internal		 1 zone 5 zones
Station Speed Dial	100/station, 24 digits each	500
System Speed Dial	24 digits each	500
Last Number Redial	15 ~ 50(by admin programming)	32 digits
CO Line Group	8	8
Station Group	10	10
Conference	3~15 Party	All ports are available
Multi-Conference	3~15 Party	Max. 3 groups
Internal MOH (13 Music Sources)	1/MBU	1
External MOH	1/MBU	1
External Paging port	1/MBU	1
External Relay Contact	2/MBU, 2/EMBU	4
Alarm Input	1/MBU	1
RS-232C Port	1/MBU	1
DTMF/CPT Receiver channels	15 chs/MBU	15 chs
FSK Receiver channels	12 chs/MBU	12 chs
PFT Circuit	1/MBU, 1/EMBU, 1/CHB308, 1/CSB316	4

1.5 System Configuration

1.5.1 System Configuration

The following Figure 1.2.1 System connection diagram shows the ipLDK-60 system configuration for all kinds of board in this system that includes the existing boards for the ipLDK-60 system and the developed new boards.

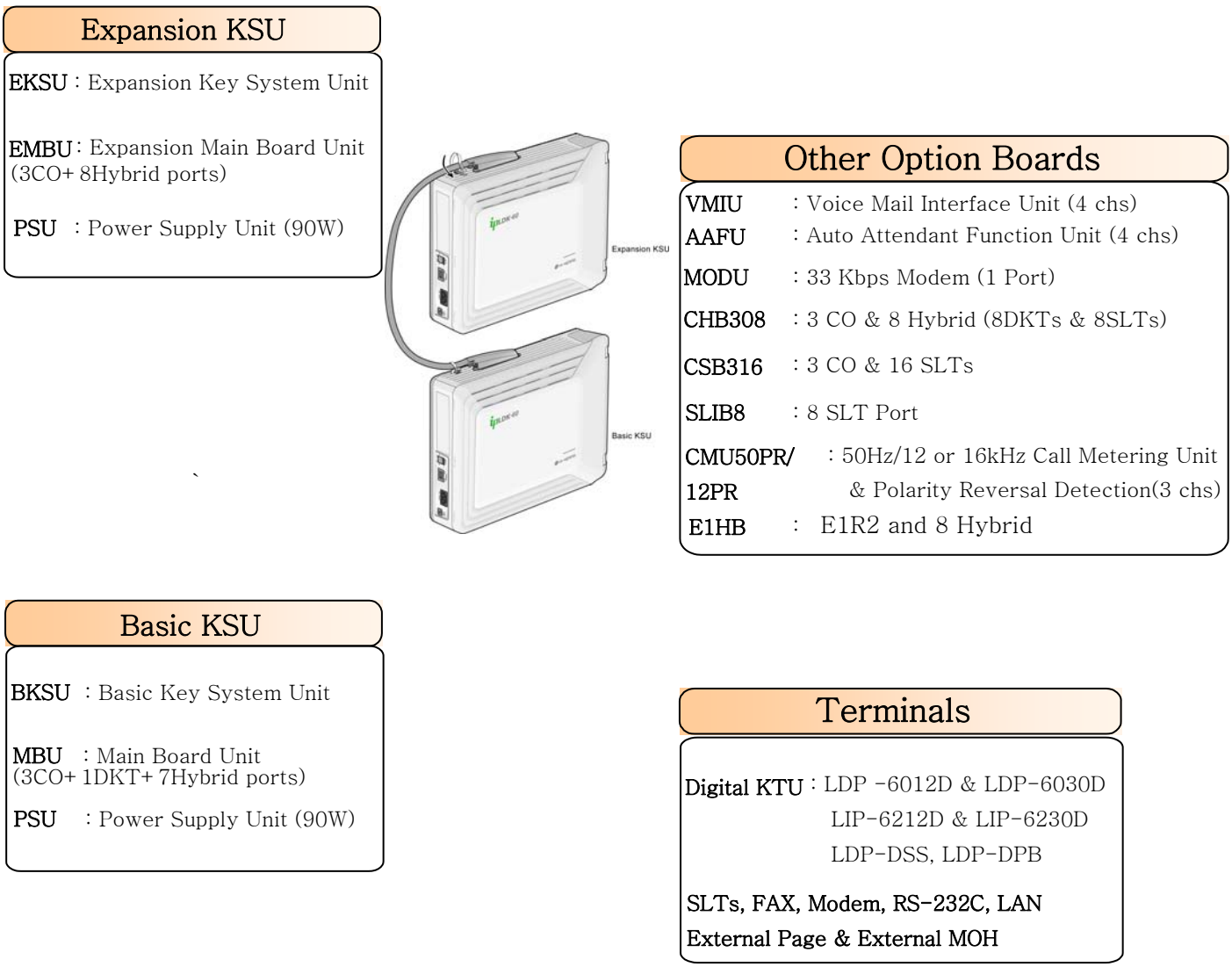


Figure 1.2.1 System Configuration

1.5.2 System Components

BASIC KSU

ITEM		OPTION BOARD	DESCRIPTION
KSU			Key Service Unit
PSU			Power Supply Unit
Main Board	MBU		Main Board Unit (3CO, 1DKT and 7 Hybrid)
		CO and Extension Boards	CO Line and DKT/SLT interface boards (CHB308, CSB316, SLIB8, E1HB8 and VOIB)
		Other Boards	VMIU, AAFU, MODU, CMU50PR, CMU12PR can be installed
CO Line and Extension Boards	CHB308		3CO Lines and 8 Hybrid Interface Board
		CMU50PR	Call Metering (50Hz) and Polarity Reversal Detection Unit (3 channels)
		CMU12PR	Call Metering (12KHz or 16KHz) and Polarity Reversal Detection Unit (3 channels)
	CSB316		3 CO Lines and 16 SLT Interface Board
		CMU50PR	Call Metering (50Hz) and Polarity Reversal Detection Unit (3 channels)
		CMU12PR	Call Metering (12KHz or 16KHz) and Polarity Reversal Detection Unit (3 channels)
		SLU8	8 SLT Interface Unit Installed on CSB316 as a default
	SLIB8		8 SLT Interface Board
	VOIB		Voice over IP Board (4ch)
		VOIU	Voice over IP unit (4ch)
	E1HB8		E1R2 and 8 Hybrid Interface Board
		SLU8	8 SLT Interface Unit Installed on E1HB8 as a default
Other Boards	VMIU		Voice Mail Interface Unit, 4 channels
	AAFU		Auto Attendant Function Unit, 4 channels
	MODU		MODEM unit (33Kbps)
	CMU50PR		Call Meeting (50Hz) and Polarity Reversal Detection Unit (3 channels)
	CMU12PR		Call Metering (12KHz or 16KHz) and Polarity Reversal Detection Unit (3 channels)

EXPANSION KSU

ITEM		OPTION BOARD	DESCRIPTION
KSU			Key Service Unit
PSU			Power Supply Unit
Main Board	EMBU		Expansion Main Board Unit (3 CO and 8 Hybrid)
		CO and Extension Boards	CO Line and DKT/SLT interface Boards (CHB308, CSB316, SLIB8)
		Other Boards	CMU12PR, CMU50PR can be installed
CO Line and Extension Boards	CHB308		3 CO Lines and 8 Hybrid Interface Board
		CMU50PR	Call Metering (50Hz) and Polarity Reversal Detection Unit (3 channels)
		CMU12PR	Call Metering (12KHz or 16KHz) and Polarity Reversal Detection Unit (3 channels)
	CSB316		3 CO Lines and 16 SLT Interface Board
		CMU50PR	Call Metering (50 Hz) and Polarity Reversal Detection Unit (3 channels)
		CMU12PR	Call Metering (12KHz or 16KHz) and Polarity Reversal Detection Unit (3 channels)
		SLU8	8 SLT Interface Unit. Installed on CSB316 as a default.
	SLIB8		8 SLT Interface Board
Other Boards	CMU50PR		Call Metering (50Hz) and Polarity Reversal Detection Unit (3 channels)
	CMU12PR		Call Metering (12KHz or 16KHz) and Polarity Reversal Detection Unit (3 channels)

Section 2. System Operation Theory

2.1 System Architecture

2.1.1 General Description

ipLDK-60 is a Hybrid Digital Key Telephone System designed to provide digital voice transmission. It uses a digital switching architecture. A Main Processor (CPU) on the MBU directly controls Option boards and expansion KSU.

The custom main switching device (ACT2) ASIC incorporate a DBID block and two GSL12 blocks for the basic voice connection of network and extension and features voice switching, conference and voice gain/tone control.
Basically, a PCM highway called MPX bus that is provided by ACT2 and is composed of 32 PCM time slots interfaces general voice PCM CODECs. Essentially, the DBID block is a Multiplexer/ Demultiplexer providing the ISO layer 1 transport mechanism for the “B” and “D” channels through the system. The Main Processor directs the ACT2 to control switching on each board.

CODECs are used to convert analog voice signals into Pulse Code Modulated (PCM) digital signals and to decode digital signals back into analog signals. All routing of voice signals through the system are accomplished in the PCM digital form.

Control Signals and digitized voice signals for each channel are routed throughout the system on the back plane in a Time Division multiplexed format (TDM). TDM is a method of utilizing the bandwidth of a transmission line to its fullest capability by transmitting many channels of information over the same link. There is a unique time interval for the transmission of each channel. Each channel is sometimes referred to as a “time slot”. These time slots are paired, that is, there is a transmitting and a receiving time slot for each channel. The transmitting time slot is connected to a receiving time slot and a receiving time slot is connected to a transmitting time slot to form a full duplex communication link.

ipLDK-60 has basic KSU and expansion KSU supports wall mounting and rack mounting. It allows any mix of station boards with CO ports. The system back plane communications channel is distributed to the expansion KSU as a logical extension of the basic KSU using a 50-pin connector with flat cable. System control is performed by a 32-bit microprocessor and governed by software stored in (Flash Memory) on MBU. This “Stored Program Control” provides a very flexible system in terms of features and functions.

2.1.2 Instrument Types

ipLDK-60 Digital Key Telephone System is a digital switching instrument providing digital communications all the way to desktop.

A. Digital Instruments

The proprietary Digital Key Telephone is a digital voice communication instrument. It means that the voice data transmitted from and received to these instruments is in digital form. The transmission medium for these instruments is a single pair of copper wires. Therefore, the full duplex digital voice information, the full duplex digital signaling information (e.g. lamp status, etc.) and the +30Vdc power for the instrument are carried through the single pair of wires. The +30Vdc is then regulated to provide lamp voltage and stepped down to ±5Vdc for logic circuits within the digital

terminal. Digital information is sent to between MBU and Keyset, which employs a Ping-Pong technique which is used to send voice and signaling information for that instrument. One “B” channel carries digital voice information while the “D” channel carries signaling information for that instrument to and from digital terminal interface boards.
The GSL12 block of ACT2 on the MBU assembles and disassembles the 2B+D information packets and controls the digital signal for transmission. Digitized voice is converted to analog voice in the instrument by the Codec device, coder/decoder and analog voice is converted to digitized voice by the same Codec for transmission back to digital terminal interface boards.

Signaling information sent on the “D” channel from the digital instrument to digital terminal interface boards is processed by the micro-processor on MBU. The micro-processor processes requests and sends system status and commands by digital terminal signaling logic in the GSL12 block to the phone.

Digitized voice information sent on the “B” channel is routed to ACT2 on the MBU for switching and gain control. The MBU switches the information to a receive “B” channel and informs the receiving terminal on the system such as another station.

B. Analog Instruments

Analog instruments can be used in ipLDK-60 system. Analog voice communication is sent over the single pair of wires from the single line interface boards to the station.

CODEC on the SLT interface circuits is used to convert digital voice signals to analog voice signals before being sent to the analog instrument and to converts analog voice from the phone to digital PCM signals before routing them through the system.

2.1.3 Capacity Limitations

A. CO Ports

It allows max. 12 central office lines to be connected to the system.

B. Station Ports

The maximum number of station (Digital KTUs or SLTs) installed on the system is 48 (Max 32DKTs, 47SLTs).

2.2 Switching

2.2.1 Back plane Architecture

ipLDK-60 system has PCM highway called MPX bus to interface voice CODECs on the MBU and Option boards to main switching device ACT2.
For extension boards and expansion KSU on which additional PCM highway is needed, system back plane architecture called ISC highway provides interfacing custom blocks such as DBID and GSL12 in ACT2 on the MBU.
The ACT2 has the DBID block and the two GSL12 blocks that provide a MPX bus and 15 pairs of ISC highways. A MPX bus is composed of 36 PCM time slots that are assigned to basic voice CODECs on the MBU and voice CODECs on the CO ports.
Expansion MBU also has custom back plane interface blocks such as DBID and GSL12 to transmit and receive “B” and “D” channels information for stations and circuits

A. EXP_ISC Highways

EXP_Inter-System Communication (EXP_ISC) Highways are buses on the back plane that distribute digitized voice and signaling data, and carry out board level communication throughout the system connector(s). These highways are provided in transmitting/receiving pairs and there are a total of 3 highway pairs in ACT2. Communication on each highway is at 8.192Mbits per second in a time division multiplexed format. Time division multiplexing creates “channels”, or time slots, that carries digitized voice, signaling data, and High-Level Data Link Control (HDLC) protocol information. Voice (“B”) channels carry digitized voice signals. Signaling (“D”) channels are employed for channel specific signaling implementation.

B. Channel Allocation

The Main Board Unit (MBU) determines which time slot on which ISC highway will be used to transmit and receive “B” and “D” channels information for all stations and circuits. The DBID or GSL12 block in ACT2 the “B” and “D” data onto the system highway at the appropriate time slot. Any port can be assigned to transmit on any transmit “B” channel and receive on any receive “B” channel. The “D” channels can also be flexibly assigned and controlled independently of the “B” channels. The HDLC inter-board communication channel on each highway is also controlled by the main processor on the MBU and placed on the highway by the DBID on peripheral board.

C. Voice Channels

PCM signals received from the digital instrument are placed on a back plane highway transmit “B” channel and sent to the MBU where gain modification and/or conference summations take place. The output is placed on a back plane highway receive “B” channel for the receiving port. All voice channels are fully 64Kbps digital time slots.

2.2.2 Signaling Channels

The “D” channels are 16Kbps channels designed to carry channel specific signaling information and low-speed user data.

2.3 Administration

2.3.1 General Description

ipLDK-60 Hybrid Key Telephone System utilizes stored program control technology. It means that system time slot switching, hardware control, and all feature implementations are controlled by software code residing on memory in the system. There are 3 types of memories used by the system, System Generic memory, Scratched memory, and Customer Database memory. All 3 types of memories are contained on the Main Board Unit (MBU).

2.3.2 System Generic Memory

The first type of memory is called System Generic memory and is stored on Flash memories on MBU. This memory is used by the Main Processor and dictated how the system operates, controls all feature implementations, monitors all functions, etc. The System Generic memory cannot be changed, however upgraded software can be downloaded to add new features to the system or change feature operation.

2.3.3 Operating Memory

The second type of memory is a system operating memory. This type of memory is a SDRAM (Synchronous Dynamic Random Access Memory) and is used for system operating). The memory is lost when system power failure is occurred and it is always initialized on system power-up.

2.3.4 Customer Database Memory

The third type of memory is called Customer Database memory. This memory is stored in RAM (Random Access Memory) and is used to store the data and status of programmable features (e.g. line ring assignment). Customer database memory is maintained during power failure by an onboard lithium battery. It is the customer database memory that must be initialized upon the first installing the system so that a known “default” database can be used to start building a customized customer database.

2.3.5 System Resources

System resources are functions made available for users on the system to support features and optional functions on the system.

A. Tone Generation

The system generates tones which are available on the system back plane “B” channels. These tones are stored digitally in ACT2. For instance, when a station is received intercom dial tone, it is commanded to monitor the “B” voice channel where system intercom dial tone resides. This procedure is the same for all tones including ringing tones, busy, recorder and ring-back tones.

B. DTMF Tones

1) DTMF Receivers

The system provides the ability to monitor and identify a Dual Tone Multiple Frequency (DTMF) tones generated externally. It supports system features and functions such as Single Line Telephone DTMF dialing and DISA calls. Calls

requiring DTMF monitoring are connected via a system “B” channel to one of 15 DTMF receiver channels in ACT2. And the CPU on the MBU identifies which digit is generated from Single Line Telephone (SLT).

2) DTMF Tone Generation

With call processing tones, the system generates DTMF tones from digitally stored tones in ACT2 as a Look-up table. DTMF tones in digital PCM form are injected onto the receive highway at the proper time slots by a digital summation technique and digital gain modified by the Tone Generation block in ACT2 device on the MBU board. More about the digital summation and gain process are discussed in section 2.4.3. Conferencing.

C. Real Time Clock

The system maintains its own real time with a real time clock circuit. The day, date and time are stored in the Device retained in the system by the on-board lithium battery on the MBU. The clock is used for many system features such as LCD time & date display, SMDR time & date printout, the wake-up call feature, etc.

D. System Information input/output (I/O)

The system can communicate detailed call records, customer database changes and diagnostic routines through multi-purpose hardware I/O ports on the system MBU. A channel Universal Asynchronous Receive /Transmit (UART) device is used to provide access to system terminal programming and diagnostic routines. The UART is directly connected to I/O port of the MBU microprocessor. With the UART, terminal programming and system SMDR printout can be accomplished simultaneously. The system customer database programming routines are directed by the system generic software allowing only one communication port to access customer database programming at a time.

1) RS-232C Communication

ipLDK-60 system provides a port of serial communication standard, RS-232C that is implemented by the first UART of CPU. It provides asynchronous serial communications up to 19200 baud rates. A log-on procedure is used to enter the system terminal programming mode and ASCII characters and control codes are used to modify the customer database. The 9 pin RS-232C port is configured as Data Communication Equipment (DCE). Data is transmitted on pin 2 and received on pin 3. Hardware flow control is supported with a Clear To Send function on pin 7. The system will halt transmission of data when this signal is asserted by the connected equipment.

2) Modem Communication

The optionally equipped modem unit functions on the second UART of main CPU (S3C4530A). Interface connectors on the MBU allow the Modem unit to be installed as an option on the MBU. The modem will answer incoming line ringing to the specified CO line with modem carrier tone. Modem communications will support up to 33k baud rates.

E. Digital Voice Announcement

The system optionally provides digitized voice announcements for system and station features. When the Voice Mail Interface Unit (VMIU) is installed on MBU, features supported to the VMIU are provided with pre-recorded system voice announcements, customized hunt group announcements and customized user voice announcements. The VMIU provides 4 channels of access to voice announcements. All kinds of voice messages are stored digitally on NAND flash memory and related information for voice are stored on RAM that is retained during power failure with a lithium battery on MBU. When commanded by the MBU, the appropriate digitized voice announcement is converted from compressed digital format to a PCM digital signal and placed on a receive “B” channel. The requesting station or system port is then commanded to monitor that channel. System software control terminates the voice announcement and frees-up the channel on the VMIU when the announcement is completed. When storing a customized voice announcement, the

requesting station is assigned a transmit “B” channel and the VMIU is assigned a corresponding receive “B” channel. The VMIU connects one of its 4 ports to the receive channel and starts monitoring for sound. If no sound is detected, the recording is stopped and the connection is broken down. If sound is detected, the digitized PCM voice is converted into compressed digitized audio and stored on NAND flash memory. The length of recorded announcements is monitored and recording is stopped if the maximum announcement length for the message being recorded is exceeded.

2.4 Call Processing

2.4.1 Internal Call Types

A. Intercom

Intercom calls begin with a station going off-hook. The station or station board receives the off-hook data and communicates to the MBU. In response, the MBU places digitized intercom dial tone on a “B” channel. The station or station board in turn switches this “B” channel to the requesting station which converts the digital signal to analog audio and the station hears the dial tone.
When you dial digits or press button on the phone, the same communication exchange from station or station board to MBU and back take place. It informs the MBU of the request, such as dialing an intercom number. The MBU then checks the scratch pad memory for status of the dialed phone and a connection is established by assigning transmitting and receiving “B” channel pair for both stations. Or a call progress tone is sent to the initiating phone such as busy tone.

B. Paging

Paging is a programmable feature either enabled or disabled in customer database programming. When a station places a page request, the MBU must check scratch pad memory at first to determine if the page zone is busy. Then the customer database programming must be checked to determine if the station is allowed to initiate a page, and to determine which stations are to receive the page. Stations that are not busy when the page was activated will be placed in the off-hook mode and will monitor the receive “B” channel assigned to that station.
External pages are set up in the same way however, communication to an external page zone can be 2-way, meaning a talkback speaker can be used for the external zone and the speaker can transmit voice back to the page initiator.

2.4.2 Outside Call Types

A. CO Calls

CO calls connect a station in the system to a central office port (telephone line) on the system. It provides access to the Public Switched Telephone Network (PSTN). When an outside line is requested by a station, the CO line interface is terminated providing CO dial tone from the local central office. A transmitting and receiving “B” channel pairs are used on the system ISC highway to route the PCM digitized audio between the station and the CO line circuit.
When the station dials DTMF digits, the dialed digit data is communicated to the MBU which in turn injects PCM data of the dialed digit DTMF tones onto the transmitting “B” channel through digital summation techniques. The CODEC associated with the CO Line decodes the PCM data into the analog wave form which is placed on the CO circuit and sent to the local central office to establish the call connection. After the call is established, the system monitors the CO line for open loop disconnecting supervision. If the tip and ring loop is open during the programmed loop supervision time, the system disconnects the call.

2.4.3 Conferencing

Conferencing is accomplished on the ipLDK-60 system by using switching block of a special custom integrated circuit called the ACT2. This device uses a technique that involves the real time digital summation of two ports (conferee's) PCM data. That is, the digitized voice is added together in a digital format, and then placed on the appropriate "B" channel. For a 3-party conference (ports A, B & C), port A will require that ports B & C be summed and placed on the receive time slot for port A. Port B will require that ports A and C be summed and placed on the receive time slot for port B. Port C will require that ports A and B be summed and placed on the receive time slot for port C. This provides a feature of 3-party conference on the system.

Since the system is designed to provide up to 3 parties in a conference, the switching block on the ACT2 was incorporated to provide this function. The digital summation process can store its output into this function. The digital summation process can store its output into this conference memory of switching block. The memory is large enough to support many digitally stored summations. The summed conference memories can then be used as one or both inputs for additional summations and its output stored in memory again or placed on a "B" channel. Conference memory is large enough to allow unlimited 3-party conference at the same time. Gain modification is performed by the switching block. A look up table stored in ACT2 permits PCM words to be adjusted for the circuits receive volume level. The gain word (volume level) is used as the Gain ROM index with the PCM word as the address. The output from the Look-Up Table is the gain modified PCM signal which is placed on the appropriate receive "B" channel.

SECTION 3. Circuit Description

3.1 Main Board Unit with CO

3.1.1 General

The MBU is the Main Board Unit of IPLDK-60. It provides basic CO, Station and extension interface circuits, physical connection with various boards, and also miscellaneous functions.
The MBU is composed of a main processor and its peripheral circuits, the three CO interface circuits, a Digital Keyset Unit (DKT) interface circuit, 7 hybrid circuits that are selected to DKT or SLT ports by Modular Jack pin assignments, a Ring Generator circuit, a system battery backup circuit, two general purpose relay contact, an internal MOH, an external MOH, an external PAGE, an alarm sense and the master clock generation circuit, as well as system's PCM voice processing circuit that has custom switching device, ACT2, for PCM tone generation and PCM Gain control .
And it also has various connectors to install CO, extension and function boards, switches, modular jacks and etc.

Basically, the MBU provides the capacity of 3/08, that is three CO interface circuits and eight extension terminal interface circuits that are composed of 1 DKT port and 7 Hybrid ports.
The capacity of IPLDK-60 system can be extended to maximum 12/48 that means the twelve CO interface ports and the forty-eight extension ports by adding EKSU, CHB308 and CSB316 board.
The system features can be added by installing function boards at connectors that are prepared on the MBU.

3.1.2 Block Diagram & Circuit Description

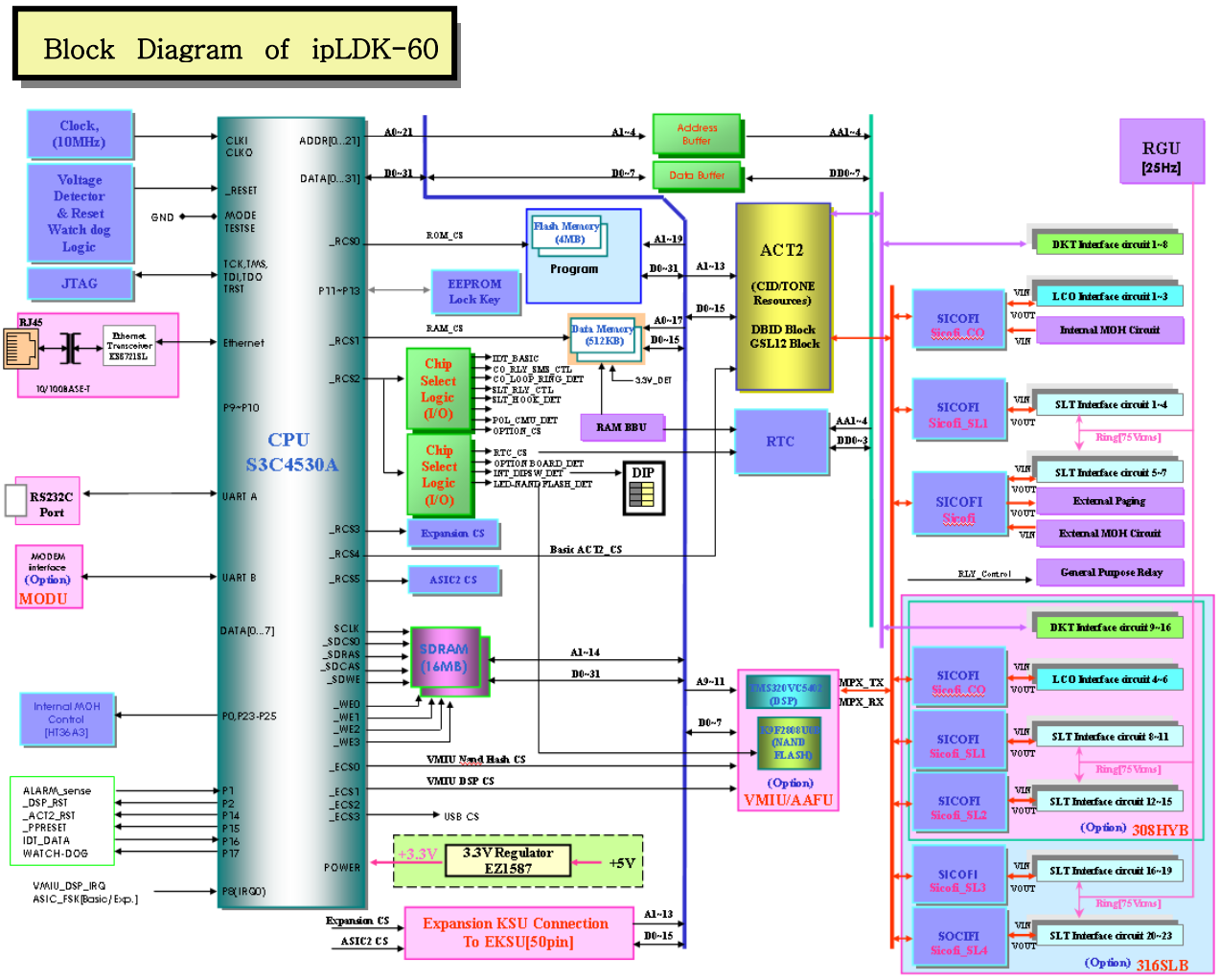


Figure 3.1.1 Block Diagram of MBU

The main processor on the MBU is to communicate with terminals such as DKTs or SLTs and to execute call processing application. As shown in the above block diagram, MBU consists of CPU (Central Processing Unit, ARM7) and its peripheral circuits, PCM and signaling control ASIC, ACT2, voltage regulator, 1 RS-232C port, reset circuit, RTC (Real Time Clock), memory back-up circuit, 1 internal MOH, 1 external MOH, 1 external paging port, 2 general relay ports, alarm detection circuit, battery backup circuit, ring generation circuit and various connectors for optional CO & extension boards and function boards as well as basic CO & Extension interface circuits.

A. CPU & System Memory

The CPU, S3C4530A, is 32bit RISC controller. It is manufactured using ARM7TDMI core designed by advanced RISC machine Ltd so it has integrated micro processor and peripheral circuits which can be used for various applications. It is especially good for communication and networking system.

It consists of system manager block, 2 SCC controllers, 2 UART channels, 2 channel GDMA, 2 32bit timers, 18 general input / output port, interrupt controller, DRAM/SRAM controller, ROM controller and flash memory controller.

It has 8Kbyte cache Ethernet controller too. S3C4530A operates at 50MHz clock speed internally.

Flash memory (U2 & U3) operates at 70ns access time. CPU manipulates programmable register so that it can read and write data. There is a code in flash memory so CPU can control system, administration and call processing with the

code. Following table shows the memory size.

Memory	Size/each	Access time	Each	Size/total
Flash	16Mbit	70ns	2	4Mbyte
SRAM	2Mbit	70ns	1	1Mbyte
SDRAM	128Mbit	7.5nS	1	16Mbyte

Table 3.1.1 Memory size

Data, which are stored in SRAM (U6 & U7), can be preserved without loss even though system is power off by the battery for memory backup. SRAM backup circuit part consists of long-time lithium battery, voltage detector and switch (SW2) for connection with backup battery.

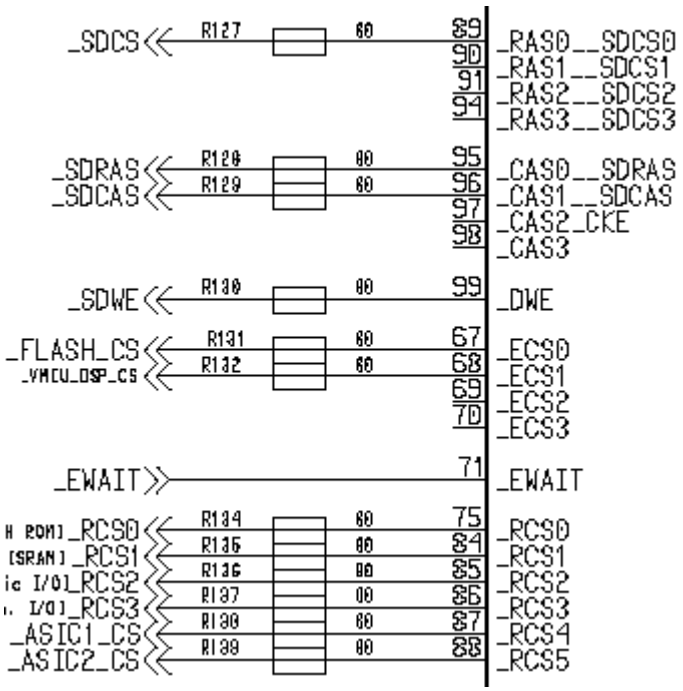


Figure 3.1.2 System memory assignment

System manager of CPU provides the four DRAM/SDRAM banks, the four External I/O banks, the six ROM/SRAM/Flash banks and etc. Each bank is set by corresponding registers and the below table shows system memory assignments for IPLDK-60 system.

Chip selection	Bus Width	Description
_SDCS0	16bits	SDRAM
_ECS0	8bits	Flash CS
_ECS1	8bits	VMIU_DSP CS
_ECS3	8bits	reserved
_RCS0	32bits	Flash memory
_RCS1	16bits	SRAM
_RCS2	8bits	Basic I/O on the MBU
_RCS3	8bits	Expansion I/O on the EMBU
_RCS4	16bits	ASIC1(ACT2 on MBU) CS
_RCS5	16bits	ASIC2(ACT2 on EMBU) CS

Table 3.1.2 Chip selection signals

The S3C4530A has an Ethernet controller which operates at 10-Mbits per second in half-duplex or full-duplex mode.
The Ethernet controller's MAC layer supports media independent interface (MII) that supplies the transmit and receive clocks of 2.5MHz at the 10-Mbit/s speed.
The MII is used to for 1 basic port of Ethernet on MBU (MJ3).

The CPU has two UART blocks that provides two independent asynchronous serial I/O (SIO) ports.
UART0 is used to monitor system operation and UART1 is used to communicate with MODEM chipset on the optional MODEM unit (MODU) that supports 33Kbps transmission rate. Both support full MODEM control signals.
In addition, the CPU provides several external I/O ports that are used to access EEPROM on the MBU, to read some functional signals and to output control signals such as reset signal.
Local oscillator (X4) on MBU generates 10MHz clock and provides it to CPU through Spread Spectrum clock generator (U20). PLL block of CPU multiplies it by 5 to generate 50MHz clock (SDCLK) for system operation.

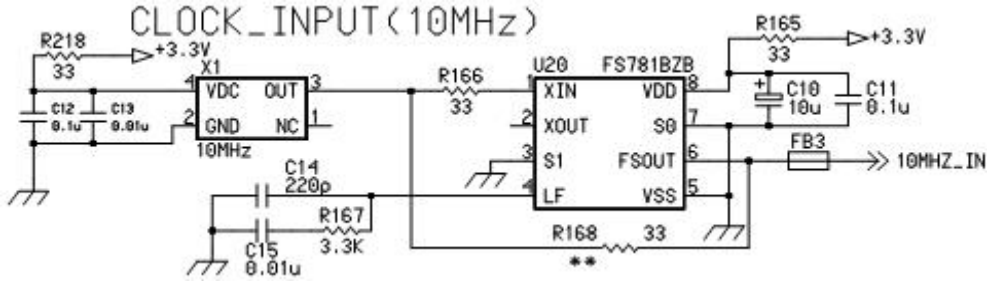


Figure 3.1.3 CPU Clock generation

B. Reset circuit

The Reset circuit generates reset pulses to CPU (_RESET), flash memory (_RESET), SRAM (3.3V_DET), real time clock (5V_DET) and peripheral boards (_PP_RST). These reset signals are generated when system is ON or reset switch (SW2) is pressed or by watch-dog reset of CPU. Power ON reset operates when +5V falls down to +4.65V in voltage detection IC (U23). The output of voltage detection IC and WDOG reset signal are connected to PLD (U120). WDOG reset signal is generated when CPU can't clear the counter (U85) by WATCH_DOG periodically due to certain abnormal operation. 5V_DET and 3.3V_DET signals are generated in case of pressing reset switch (SW3), system power ON, and power instability to prevent SRAM and RTC data from being written with garbage data.
As shown in the below figure, power supplies, VBP and VB, are supplied by dip switch (SW2) and battery (BAT1, 3.6V) for protecting of system memory and RTC date/time data during local power failure. VBP is the power supplied to SRAM and VB to RTC.

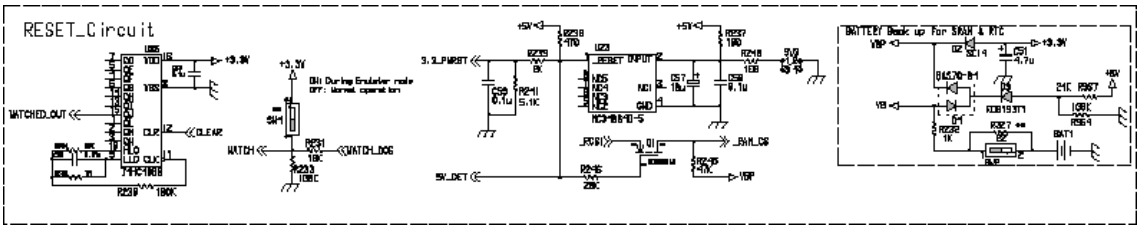


Figure 3.1.4 Reset and backup battery circuit

C. PLD1

The PLD1(U120) is used to control MBU board, which are reset signal control, address decoding for chip-selection signal generation, support latch buffer functions for ring relay, SLT hook sense, Co loop relay control, Co loop ring sense and general relay control.

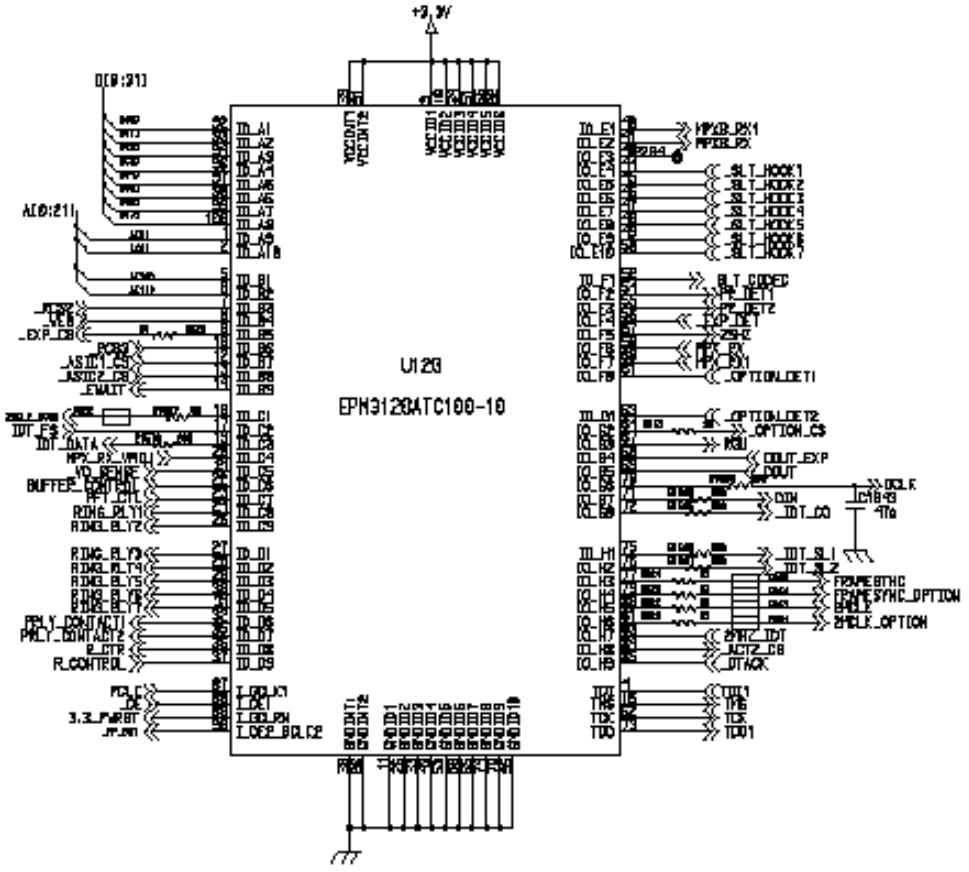


Figure 3.1.5 PDL1 Circuit

D. PLD2

The PLD2(U121) is used to control MBU board ,which are address decoding to generate chip selection signals, codec devices control, DIP switch read, LED control, and MPX bus control.

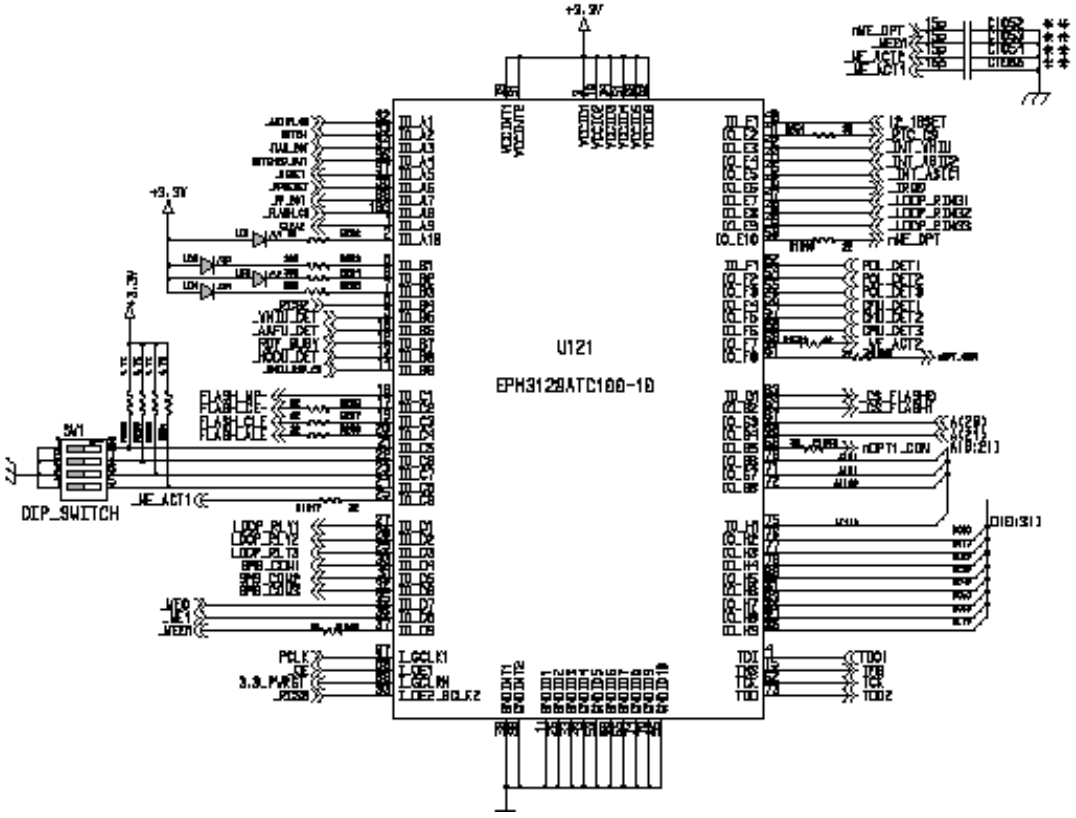


Figure 3.1.6 PDL2 Circuit

E. EEPROM

The 2Kbits EEPROM(U25) stores system Serial information and Software function key for using and is controlled by general I/O signals from CPU, _PRST, _PSCLK and PSDATA.

F. Level buffer

The CPU and system memory such as SDRAM, flash memory, and SRAM work with +3.3V power supply and other peripheral devices operate with +5V power.

Bi-directional data buffer, U33 and U91~U93, converts +3.3V data bus from CPU to +5V data bus and vice versa.

Buffers, U34~U35, convert +3.3V address bus to +5V bus and various control signals.

G. RTC

The MBU incorporates a Real Time Clock, RTC72421B (U24), which maintains the date and time for the system. Information from the RTC is useful for the date and time display at keyset, call record, and alarm record, etc. The RAM Battery Back-up circuitry output also connected to this kind of device so that clock operation is maintained during a local power failure.

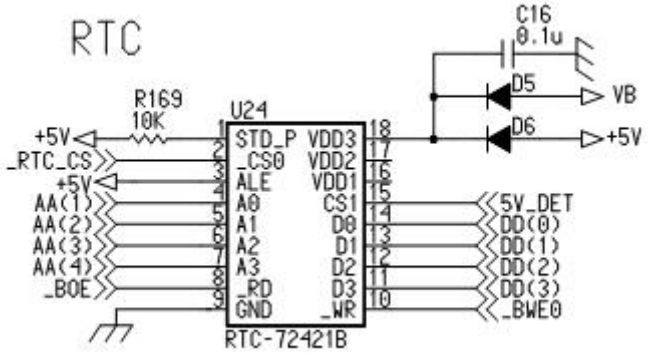


Figure 3.1.7 Real Time clock circuit

H. ACT2 and its peripheral circuits

The ACT2 (U8) is a custom switching device that has a DBID block and two GSL12 blocks so that it can cover all functions for SOHO system. And it provides three PCM highways (TX/RX_ISC0~2) to interface system back-plane interface device, DBID (kind of time slot assigner), on the peripheral boards and several ports for general purpose I/O.
ACT2 supports PCM switching, gain control, tone generation, and conferencing together with a tone/gain generation function. The one DBID block makes a PCM highway called MPX bus that is composed of 32 PCM time slots and used to interface all PCM CODECs on the MBU, CO boards, and some function boards as shown in the Figure 3.1.8.

Reference clock 2MHz and 8KHz frame sync signal to mask time slot assigned to specific PCM CODEC are provided by ACT2, so that PCM CODEC transmits and receives its voice data to/from specific time slot of MPXB PCM highway.
GSL12 block that is composed of internal DBID and DASL logic block (compatible to TP3406) provides 32 digital terminal interface circuits. The eight ports (DKT1~DKT8) are assigned to 8 basic digital terminal circuits on the MBU and the rest signals (DKT9~DKT32) are routed to digital terminal interface part of EMBU, CHB308.
The data transmission ACK signal (_DTACK) generated from ACT2 is routed to the wait signal of CPU after NAND logical computation.

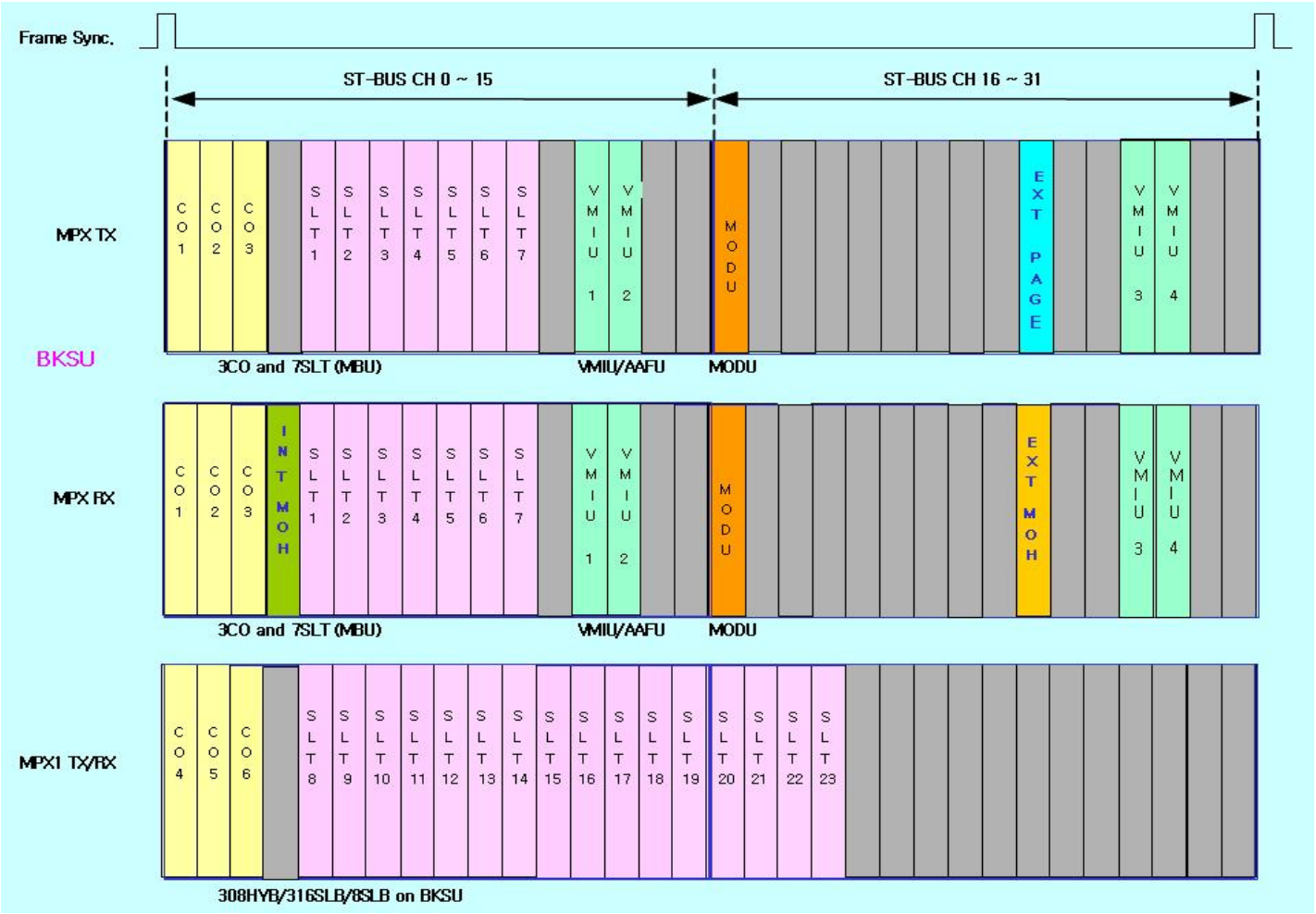


Figure 3.1.8 MPX PCM highway time slots assignment

The oscillator (X3) on MBU generates 32.768MHz clock and provides it to ACT2 through Spread Spectrum clock generator (U40) for EMI reduction. ACT2 generates various clocks 2MHz, and 8KHz needed for system operation from system reference clock, CLK32M.
An internal 32MHz of X3 or an FRAMEOUT to EMBU is provided to PLL block of ACT2.

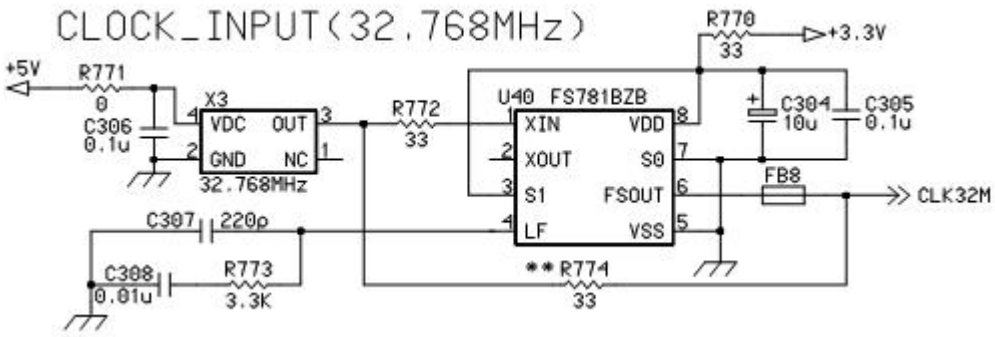


Figure 3.1.9 ACT2 Clock generation

Signal name	Frequency	Description
2MHz_VMIU	2MHz	Programmable Clock Out for VMIU
2MHz_MODU	2MHz	Programmable Clock Out for MODU
2MHz_IDT	2MHz	Programmable Clock Out for Sicofi/IDT on MBU and CHB308/CSB316/SLIB8
CLK32M	32MHz	32.768MHz Clock input
EXP_FRAME	8KHz	Frame Sync for Expansion KSU (EMBU)
VMIU_FS	8KHz	Frame Sync for DSP(U1) on the VMIU/AAFU
MODU_FS	8KHz	Frame Sync for CODEC(U3) on the MODU
IDT_FS	8KHz	Frame Sync for SICOFI and IDT on the MBU/EMBU/CHB308/CSB316

Table 3.1.3 Clock and Frame signals

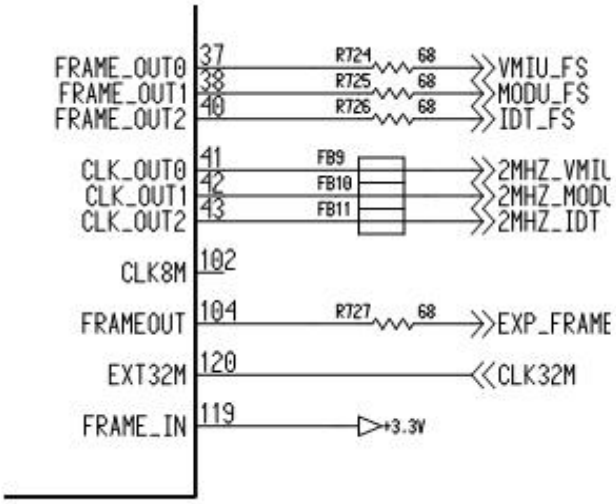


Figure 3.1.10 System clock generation circuit

Digital terminal interface port is composed of two transmit signals, TXP and TXN, and a receive signal, RX_0~23. TXP_0~23 and TXN_0~23 pins of the GSL12 block of ACT2 are used for transmit digital line signal to digital terminals and the RX_0~23 pins are used for receive digital line signal from digital terminals.
Resistors (R764~R769) to generate bias voltage for DASL block should have 1% accuracy in terms of the resistance. NT_BIAS (1.515VDC), PT_BIAS (1.785VDC) Voltage level is very important.

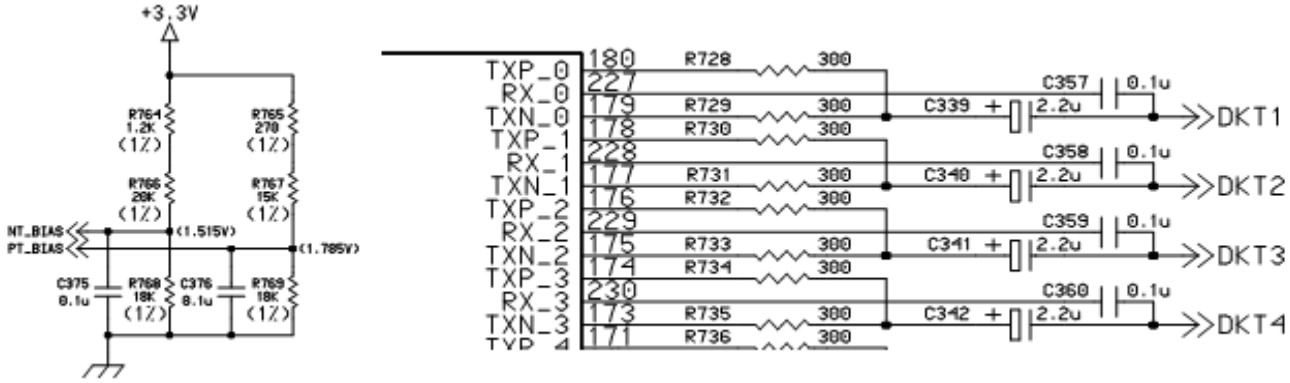


Figure 3.1.11 DKT interface circuit and bias voltage

I. Loop start CO interface circuit

The MBU provides basic CO interface circuits that are composed of three line interface circuits, two relay controllers, and a 4 channel PCM CODEC.
The following figures show circuit diagram of 1st port of the four CO line interface circuits. Each port is identical. The CO line Tip and Ring connect to the modular jack (MJ1) on the MBU. Basic line protection circuitry consists of 3-pole arrestor (AR1) between TIP and Ring. This device provides protection for the loop detect/current sink circuitry.

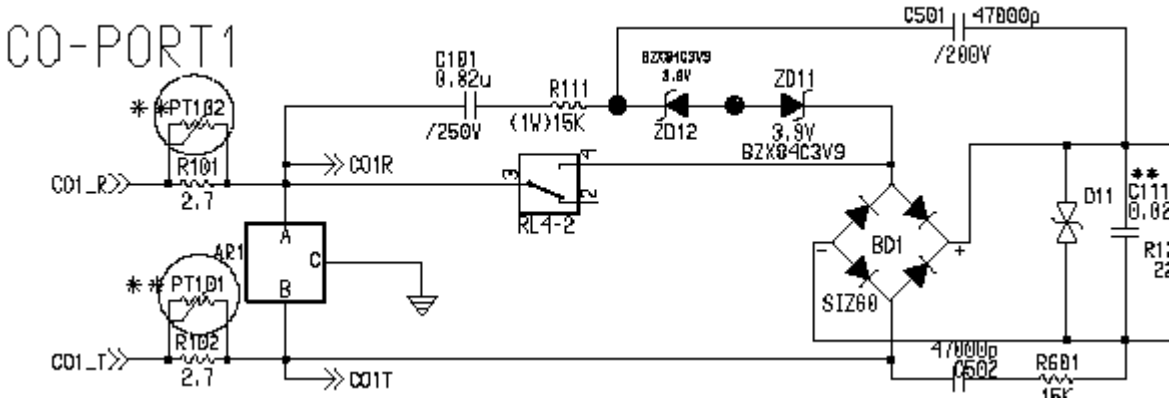


Figure 3.1.12 CO Line Interface and protection circuit

The loop seizure/pulse dial relay is under the control of the output data of the Loop relay control buffer (U91).These control data are sent to relay driver U52 to activate/deactivate the Loop/Pulse dial relay (RL1 for the port 1). When closed, the relay contacts complete the circuit to the remainder of the CO interface circuit.

The Loop detect/current sink circuit diode bridge, BD1, maintains proper voltage polarity. Voltage limit is provided by the TVS, D11 that protects the current sink circuit of transistors, Q11 & Q12, resistors and capacitor. Base drive for Q11 is derived from the CO loop to the series RC circuit of R441 and C421 and is limited by current sensing circuits, Q12, R421, and R422 as much as less than 60mA loop current.
Loop current and ring is detected by the same circuit that is composed of the resistor and opto-isolator (R431 and U100). The output of the opto-isolator is connected to the input pin #2 (_LOOP_RING1) of U31, and the data is then available to the main CPU for further processing.
The current sink circuit permits the audio transformer to operate in a non-saturated state with DC blocking from series capacitor, C431.

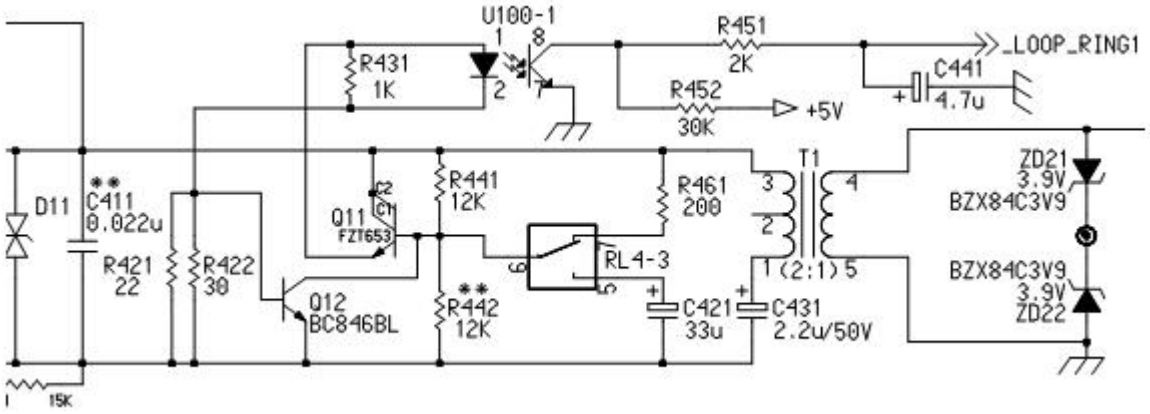


Figure 3.1.13 Loop current sink circuit

Also CO1 port is comprised of the 4-channel PCM CODEC (U9, SICOFI) interface part and T1 (matching transformer), U101 (amplifier) and other passive devices. The main functions of this part are the isolation of the system side from CO line side and the gain conversion of voice signal.
The digital filters in the SICOFI provide necessary transmit and receive filtering for voice telephone circuits to interface with time-division multiplexed systems. An integrated programmable DSP realizes AC impedance matching, trans-hybrid balance, frequency response correction and gain adjustment functions.

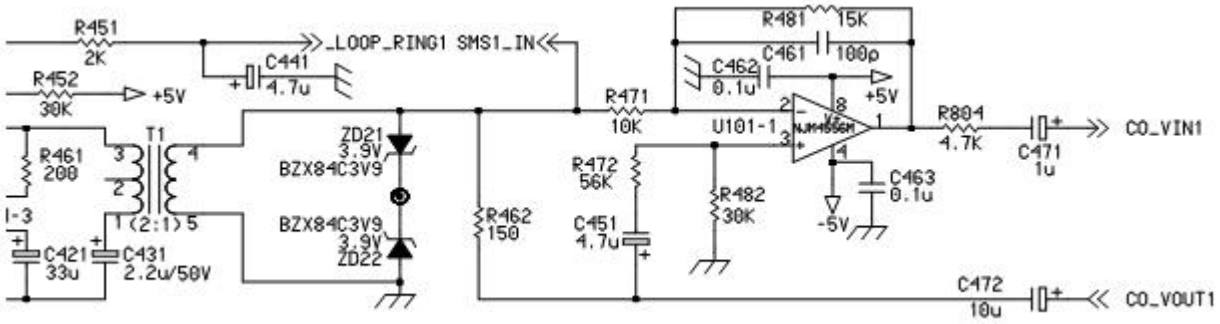


Figure 3.1.14 PCM CODEC interface circuit at secondary part.

The 4 Channel PCM CODEC, U9, provides A/D conversion of signals from the Analog (CO_VIN1) line to MPX_RX PCM highway and D/A conversion of PCM signals to the Analog (CO_VOUT1) line from MPXB_TX PCM highway. Digitized voice and data are available from the corresponding PCM time slots of MPXB bus (MPXB_TX and MPXB_RX) that are provided by DBID block.
These internal DBID block in the ACT2 provides the mux/demux of the PCM signals to and from the appropriate ISC highway as a time slot assigner.

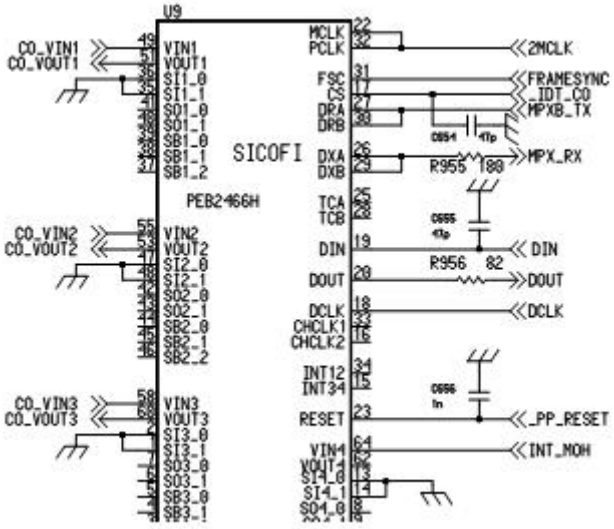


Figure 3.1.15 CO line and PCM highway interface of SICOFI

The CPU can read and write the internal registers of SICOFI by control signals that are DIN, DOUT and DCLK generated from SICOFI control buffer (U29). Loop relays are driven by relay drivers (U52). CPU writes control data (active: high) to latch buffers (U91), the latched data is routed to input pin of relay driver (U52), and then each driving circuit is activated.

LOOP_RLY1~3 are enable signals for relays in CO interface circuits and PFT_CTL is for power failure transfer (PFT) relay, and RLY_CONTACT, 1&2 are for free relay contacts.

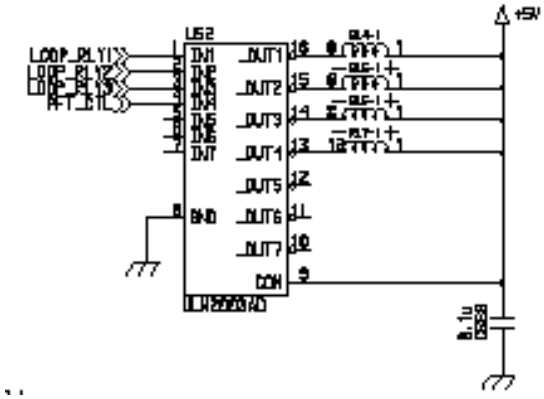


Figure 3.1.16 Loop and PFT relays driver

J. SLT interface circuit

The circuit of each SLT Port is composed of SLT line interface and protection, +36V power feeding, IDT interface part, and hook-sensing parts as shown below. Seven SLTs can be connected to the MBU through modular jack (MJ2).

Each SLT interface circuit is identical and this section describes first SLT interface circuit as an example.

The line protection circuitry consists of one bridge diode (BD11) between the Tip and Ring input. RL11-2: Relay for providing the ring signal and occupying the DC loop.

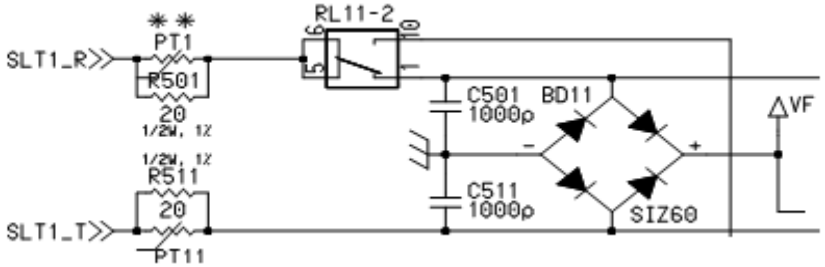


Figure 3.1.17 SLT line interface and protection circuit

As the figure shown below, +36V power feeding part are connected to SLT line interface and protection part. So +36V power is supplied to SLT through resistors and transistors(Q21 and Q31), the SLT line interface and protection circuit. The resistors(R656, R701 and R671), transistors(Q41 and Q101), capacitor(C728) and zener diode(ZD10) makes the loop current be limited.

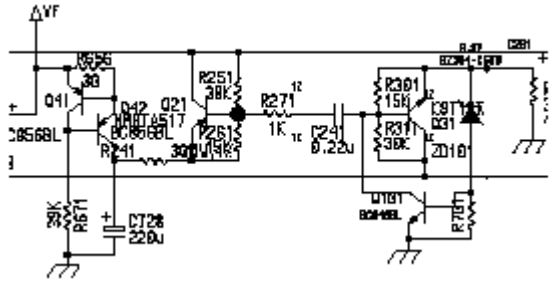


Figure 3.1.18 +36V power feeding circuit and current limiting circuit

The Sicofi interface part is comprised of T11 (matching transformer), U111 (amplifier) and other passive devices. The main functions of this part are the isolation of the system side from SLT line side and the gain conversion of voice signal. The audio transformer, T11, operates in a non-saturated condition with DC blocking capacitor, C561. Impedance matching is incorporated on the secondary winding of the audio transformer through appropriate RC networks (R661, R681 and C581) withSICOFI.

SLT_VIN1 and SLT_VOUT1 nodes are connected to the analog interface ofSICOFI821054 (U10).

IDT (U10) provides many functions, which are A/D conversion of voice signal, impedance matching, analog amplification/attenuation, trans-hybrid balancing, PCM highway interface and etc. For more information aboutSICOFI, refer to the datasheet ofSICOFI821054 manufactured bySICOFI.

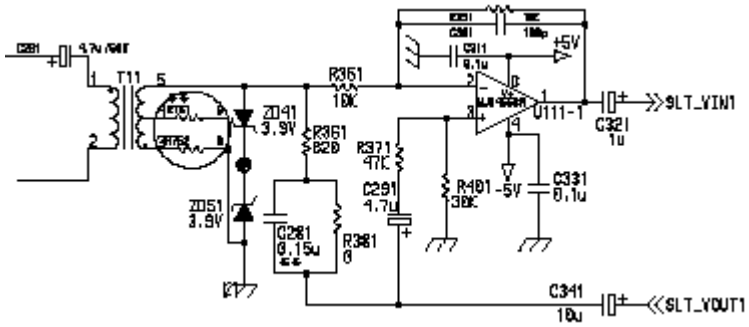


Figure 3.1.19 SICOFI interface circuit

The key devices of the hook-sensing part are U30 (octal buffer/line driver) and U110 (LM2903; comparator).

The off-hook sense circuit comprises a comparator and octal buffer/line driver for detecting the loop current. And the

CPU on MBU reads this hook status information through input ports of U30.
Off-hook sensing process of SLT circuit can be explained as two cases, that is, when SLT rings or not.
If the called party doing off-hook at the time of no ringing, the voltage applied to R621 (input pin#3 of comparator) goes down to below VLD (21.6VDC) and then the _SLT_HOOK1 signal becomes low.
If the called party answers the phone at the moment of ringing, ring current is getting charged to RC circuit (R531 and C521). When the charged voltage of C521 discharges, if the voltage is higher than 3.9V (ZD31) plus forward voltage of diode in the U30, octal buffer (U30), gets turned on. Likewise, the voltage applied to R621 (input pin#3 of comparator) goes down to below VLD and then the _SLT_HOOK1 signal becomes low.
The values of VLD and VRD should be set properly in consideration of ring trip, loop length and etc.
Here, IPLDK-60, VLD = + 21.6VDC, VRD = + 16.3VDC
The ring signal passes resistor (R521) and is sent to the SLT line through the RL11-2 (ring/loop relay).
The Ring/Loop relay is controlled by the output signal (RING_RLY#) from U93 and relay driver (U53, ULN2003AD).

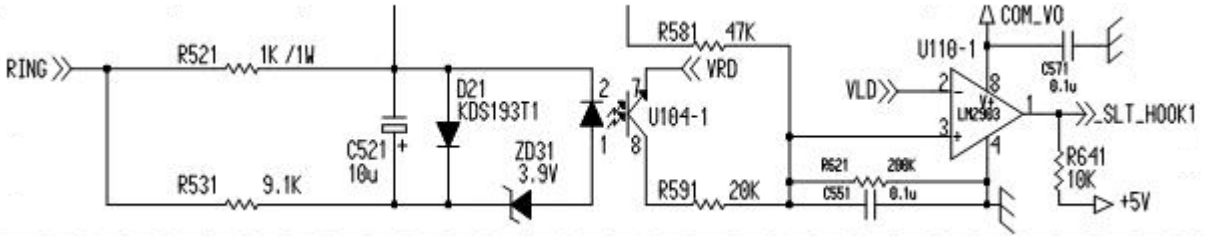


Figure 3.1.20 Off-hook sensing circuit

K. Digital terminal interface circuit

The digital terminal (or Digital Key Telephone, DKT) interface circuit is composed of the GSL12 block of ACT2, a matching transformer, capacitors, resistors and a poly-switch. It provides a connection with two wires to one digital terminal. Capacitors and diodes are used for protecting line interface circuit against ESD or lightning surge.
It provides +30V power to the digital terminal through the transformer and the poly-switch is used to protect the over current due to line shortage.
The TXP_0 ~ TXP_15, TXN_0 ~ TXN_15 pins of the GSL12 block of ACT2 on the MBU are output terminals and used to transmit a digitized voice and data to the digital terminals via the transformer. And the RX-0 ~ RX-15 pins of the GSL12 block of ACT2 are input terminals and are used to receive a digitized voice and data from the digital terminals.

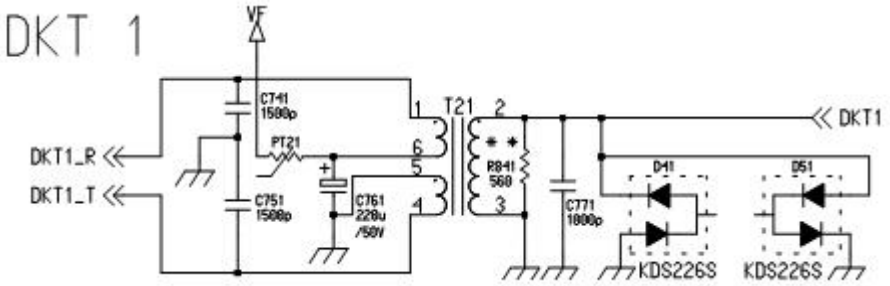


Figure 3.1.21 DKT interface circuit

L. Music On Hold (MOH) circuit

IPLDK-60 provides two MOH sources that are internal MOH and external MOH. It will operate control signals from CPU(MOH_SCLK,MOH_SDATA). R492,R493 control the speed of operation (Music play), U50.
Internal MOH is generated by Music IC (U50) and is routed to input port VIN4 of SICOFI (U9) for A/D conversion.

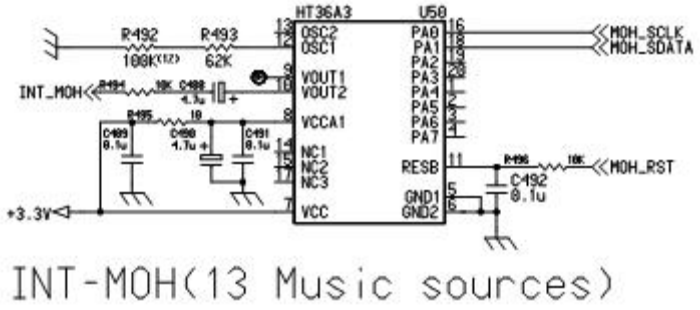


Figure 3.1.22 Internal MOH circuit

External MOH signal from audio jack (PJ1) is routed toSICOFI (U11) for A/D conversion and then digitized MOH data is transmitted to a time slot of PCM highway. Audio transformer T4 protects the secondary circuits from high voltage surge.

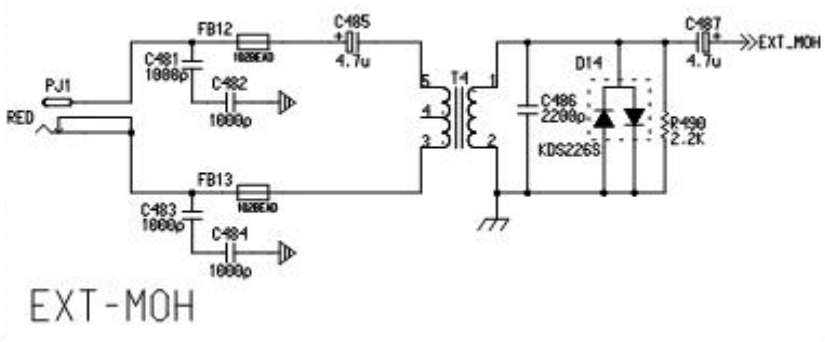


Figure 3.1.23 External MOH circuit

M. External Paging circuit

External paging signal is generated by SICOFI (U11) that extracts paging data from the specific time slot and converts it to analog signal. Audio transformer T5 protects the secondary circuits from high voltage surge and page signal (EXT_PAGING) is connected to external audio instrument through modular jack, PJ2.

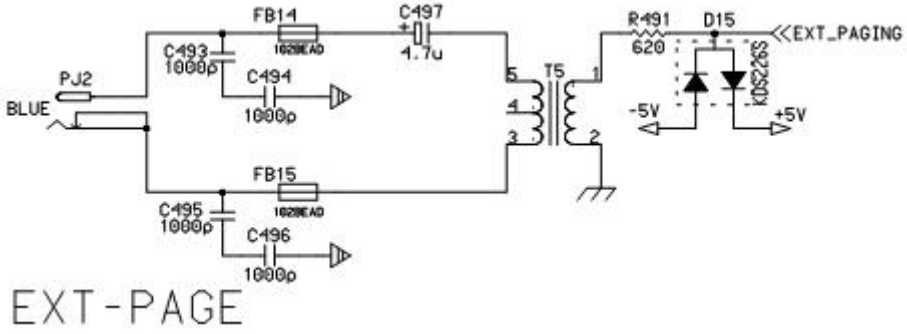


Figure 3.1.24 External Paging circuit

N. DC/DC circuit

This circuit converts +5V power to +3.3V power that is used by main CPU and its peripheral devices such as SDRAM, Flash memory, ACT2 and so on. Power regulator U38 generates Fixed +3.3VDC power.

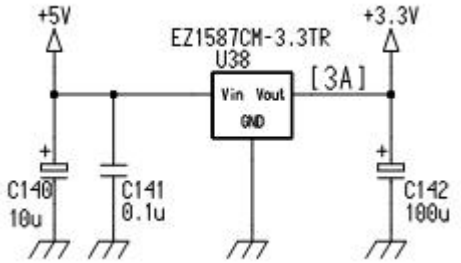


Figure 3.1.25 +3.3V generation circuit

O. RS232C serial port

The line transceiver section consists of RS-232C line transceiver IC, U12, capacitors, resistor and protection bead. The line transceiver IC receives a TTL level data from the UART0 of CPU and converts it to a RS-232C format. And also, it receives a RS-232C format signals from external equipment and converts it to a TTL level.

Q. RGU (Ring Generator Unit)

The Ring Generation circuit provides the ring voltage to SLT interface circuits to ringing the SLT. It generates 25Hz Square wave ring signal whose voltage is 75Vrms and can support simultaneous ringing for 8 SLTs.
The ring source, or 25Hz square wave signal, is generated by FRAMESYNC_OPTION, counters (U64& U65) and other peripheral parts. The small voltage of sine wave signal is amplified by DC/DC step-up circuit which is implemented by PWM switching IC (U63, TL494) and its peripheral parts, power transformer (T30), Power transistors (Q52), and so on.

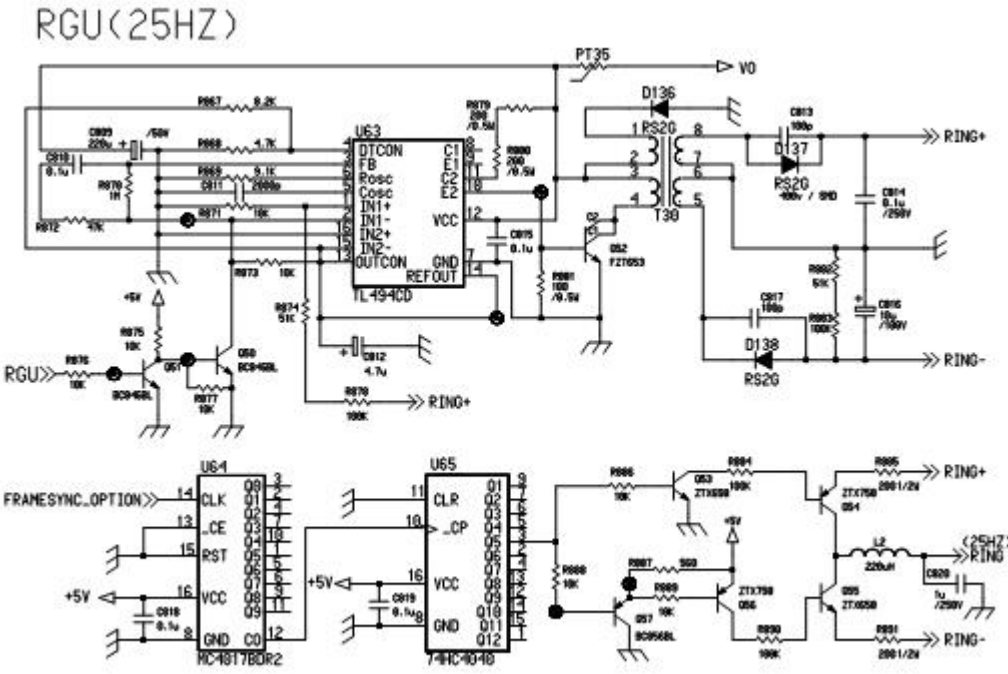


Figure 3.1.26 Ring generation circuit

R. LAN Circuit

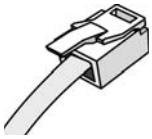
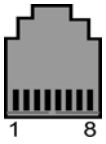
The S3C4530A has an Ethernet controller which operates at 10-Mbits per second in half-duplex or full-duplex mode.
The Ethernet controller's MAC layer supports media independent interface (MII) that supplies the transmit and receive clocks of 2.5MHz at the 10-Mbit/s speed.
The MII is used to LAN circuit through connector, MJ3, on the MBU.
In half-duplex mode, CPU supports IEEE802.3 carrier sense multiple access with collision detection (CSMA/CD) protocol and in full-duplex mode, it supports IEEE 802.3 MAC control layer, including pause operation for flow control.

LAN circuit is composed of 10/100BaseTX/FX MII Physical Layer Transceiver with Auto cross-over (U30, KSZ8721SL), Ethernet interface circuit, power regulator that provides PHY with +2.5V power, and EEPROM in which some information such as MAC address is stored. Data transformer T1 protects the secondary circuits from high voltage surge.

It is possible to check the state of LANU visually by LEDs on RJ45 modular jack (MJ1).

LED	MEANING
LD1 (Green)	Data Transfer Status (toggle) – ON, link; OFF, no link
LD2 (Orange)	Link Status and Activity – ON, link and activity at 100MBps, OFF, link and activity at 10MBps)

MODULAR JACK (MJ3)

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	Reserved	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

3.1.3 Meaning of Connectors, Switches and LEDs

There are various kinds of connectors, switches, modular jacks and LEDs in the MBU. The below figure MBU Configuration shows the configuration of MBU and the location of connectors, switches, modular jacks and LEDs.

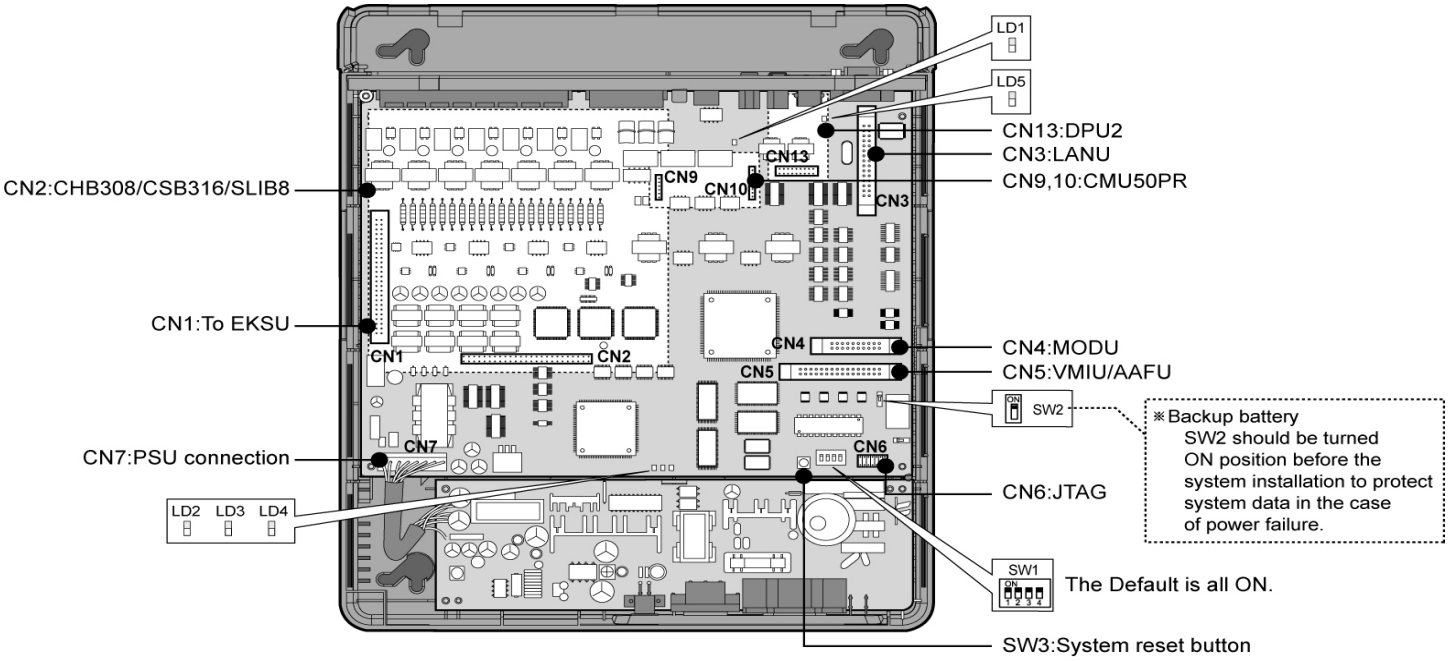


Figure 3.1.27 MBU Layout

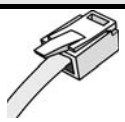
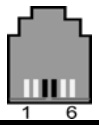
A. Functions of connectors, modular jacks and switches

SWITCH/CONNECTOR	FUNCTIONS	REMARK
CN1	KSU Connection to Expansion KSU with Flat cable	50Pins
CN2	CO and Extension Board(CHB308/CSB316/SLIB8) installation	50Pins
MJ3	LAN Connection	8Pins
CN4	MODU Installation	20Pins
CN5	VMIU/AAFU Installation	32Pins
CN9 & CN10	CMU12/50PR Installation	6 & 8Pins
CN13	DPU2 Installation	16Pins
CN6	JTAG Port for Emulator	For Test
CN7	PSU Connection (+5V, -5V, +30V)	7Pins
CN8	RS-232C Port Connection	9Pins
MJ1	3 CO Lines Connection	3Arrays
MJ2	8 DKTs / 1 DKT and 7 SLTs Connection	8Arrays
Cn13	Alarm Sensor and External Relay Contact	1Array
PJ1 (Red)	External MOH Connection	
PJ2 (Blue)	External PAGE Connection	
SW1	4 Poles DIP Switch for Software Usage	Default = All ON
SW2	Lithium Battery ON/OFF Switch for Memory and RTC Back Up	Default = OFF
SW3	System Reset Button	

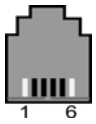
Table 3.1.4 Functions of connectors, switches, and modular jacks

Functions of modular jacks (MJ1~MJ4)

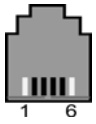
MJ1 (CO)

Connector	PIN Number	NO	Signal Name
RJ11 		1,2	N/A
		3,4	CO-T, CO-R
		5,6	N/A

MJ2-1 (DKT Only)

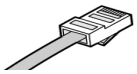
CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1	N/A
		2	DKT-T
		3,4	ALARM Detection
		5	DKT-R
		6	N/A

MJ2-2, 3, 4, 5, 6, 7, 8 (Hybrid: DKT & SLT)

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1	N/A
		2	DKT-T
		3,4	SLT-T, SLT-R
		5	DKT-R
		6	N/A

NOTE—When installing DKT or SLT on Hybrid Ports, (MJ2-2,3,4,5,6,7,8), keep the above pin assignment. Otherwise the DKT or SLT will not operate normally.

MJ3 (LAN)

Connector	Pin Number	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	RESERVED	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

SW1 Functions: The default is all ON

The MBU also has a four-position DIP switch, SW1. The function of each switch position is as follows;
Default setting: All ON position

SWITCH	FUNCTION	OFF	ON (DEFAULT)
1-1	Administration Programming Access	Disable	Enable
1-2	Command/Event Trace (Software Testing)	Enable	Disable
1-3	Simplified Message Desk Control (SMDI – Voice Mail)	SMDI ON	SMDI OFF
1-4	Database Default on Power Up	Disable	Enable

Table 3.1.5 SW1 functions

Before programming the system, switch 1-4 should be placed in the ON position and power cycled off and on to initialize the system database to default. Once the database has been initialized, switch 1-4 should be placed in the off position and put SW2 for the lithium battery on so as to protect the database.

B. LED indications

The 5 LEDs mounted in the MBU provide diagnostic information for states of the board. The below table shows the meaning of various states of LEDs.

LED	MEANING
LD1 (Blue)	Periodic Toggle—ON, 300msec; OFF, 300msec.
LD2 (Blue)	In Use or Idle Status—ON, One or more Port(s) in use; OFF, idle
LD3 (Blue)	Timer—Flashes every 100msec.
LD4 (Blue)	LCD Active Updating—Flashes every 300msec.

Table 3.1.6 LED indications

C. PIN descriptions of various connectors

1) Expansion KSU connection

Expansion KSU should be connected to CN1 by using 50-pin flat cable.

CNNT	Pin Number	Pin name	Description
CN1	A1,A3,A24,B1,B3,B24	GND	Ground
	A8~A14,B9~B14	EA(0) ~ EA(12)	Address for Expansion MBU
	A15~A22,B15~B22	ED(0) ~ ED(15)	Data for Expansion MBU
	A4,B4	_DTACK, EPFT_CTL	Data Transfer Acknowledge, PFT Control for EMBU
	A25	+5V_A	Expansion KSU power status signal
	A5,B5	_EPP_RST, EEXP_FRAME	PPRESET, FRAME for Expansion MBU
	A6,B6	_EASIC_RST, _EASIC2_CS	ASIC_RESET and Chip Select for Expansion ACT2
	A7,B7	_EOE, _ERCS3	Out Enable and RCS(Chip Select) for Expansion KSU
	B8	_WE01	Write Enable for Expansion KSU
	A2,B2	EXP_TXISC0, EXP_RXISC0	TXISC0 and RXISC0 for Expansion MBU
	A23,B23	DOUT_EXP, _INT_ASIC2	Data out from Sicofi/IDT on EKSU and Interrupt(not used) from Expansion ACT2
	B25	_EXP_DET	Expansion Detection

Table 3.1.7 Pin assignment of CN1

2) CO and Station boards installation

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN2	A1,B1	VF	+30V Power	B6	MPX_RX1(c)	MPX Bus for Option
	A2,B2	+5V	+5V Power	B7	MPXB_TX1(d)	MPX Bus for Option
	A3	-5V	-5V Power	B8	_BWE0(e)	Write Enable for option
	A4,A9,A10,A11	GND	Ground	B9	_BOE(f)	Out Enable for option
	A12,A21,A23, A25			B10	_PP_RESET	PP_Reset for option
	B3,B5,B11,B23			B12	_OPTION_CS(b)	Option Chip Select
	A5,A6,A7,A8	AA(1)~AA(4)	Address	B13	2MCLK_OPTION(a)	2 MHz Clock for Option
	A13~A20	DD(0)~DD(7)	Data	B14	FRAMESYNC _OPTION(g)	Framesync for Option
	A22	DOUT	Data out from Sicofi/IDT	B15~B22	DKT9~DKT16	DKT Interfaces for Option(CHB308)
	A24	RING	Ring signal	B24,B25	_OPTION_DET1/2(h)	Option Detection 1 & 2

Table 3.1.8 Pin assignment of CN2

※NOTE

(a) Inversed 2MHz clock signal from main switching IC, ACT2 on the MBU.
PCM CODEC on the CO and Station board needs frame sync, 2MHZ clock and PCM bus TX/RX signals for interfacing voice B-channel bus (called MPXB) with ACT2.

(b) Chip selection signal to access CO and Station boards like CHB308, CSB316 and SLIB8: active "LOW".

(c) Multiplexed Bus (MPXB) is voice B-channel bus that is for interfacing voice CODEC chipset with main switching IC. MPXB consists of 32 PCM timeslots and its transmission rate is 2Mbps.
MPXB_RX is PCM RX signal from various voice chipsets on the peripheral boards to ACT2.

(d) MPXB_TX is PCM TX signal from ACT2 to various voice chipsets on the peripheral boards.

(e) +5V buffered write enable byte0 signal that is asserted to LOW for CPU to write data to 8bit peripheral devices.

(f) +5V buffered output (that is, read) enable signal that is driven to LOW when CPU reads data from peripheral devices.

(g) FRAMESYNC_OPTION is 125us frame sync signal to mask 16th PCM time slot out of 32 time slots of MPXB bus.

(h) When any CO and Station board is installed, _OPTION_DET1/2 is driven to "LOW" for CPU to detect CO and Station board installation.

3) MODU installation

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN4	A1,B1	+5V	+5V power	B4	_PPRESET	PP reset signal
	A2,B2	-5V	-5V Power	B5	MODU_FRAMESYNC (a)	Framesync for MODU
	A4	VF	+30V Power	B7	2MCLK_MODU (b)	2 MHz Clock for MODU
	A3,A5,B3, B6	GND	Ground	B8	MPXB_TX	PCM bus TX
	A6	UART_RXD2	UART RX data	B9	MPX_RX	PCM bus RX
	A7	UART_TXD2	UART TX data	B10	_MODU_DET	MODU Detection
	A8	UART_CTS2	UART CTS signal			
	A9	UART_RTS2	UART RTS signal			
	A10	UART_DCD2	UART DCD signal			

Table 3.1.9 Pin assignment of CN4

※NOTE

(a) 8KHz frame sync signal to mask PCM time slot assigned to MODU channel.

(b) Inversed 2MHz clock signal from main switching IC, ACT2, on the MBU.

4) VMIU/AAFU installation

CNNT	Pin Number	Pin name	Description	Pin Number	Pin name	Description
CN5	A1,B1	+5V	+5V power	B2	_WE0	Write Enable
	A5,A16	GND	Ground	B3	_OE	Out Enable
	A2	_FLASH_CS	Flash Chip Select	B4	MPX_RX_VMIU	PCM bus RX for VMIU
	A3	_DSPRST	DSP Reset	B5	_INT_VMIU	Interrupt for VMIU
	A4	MPX_TX	PCM bus TX	B6	_VMIU_DSP_CS	VMIU DSP Chip Select
	A6~A13	VD(1)~VD(8)	Data for VMIU	B7	2MHz_VMIU(a)	2 MHz for VMIU/AAFU
	A14	A(9)	Address	B8	VMIU_FS(b)	VMIU Framesync
	A15	A(11)	Address	B9	RDY_BUSY	Ready Busy
	B14	A(10)	Address	B10	FLASH_WP-	Flash Memory Write Protect
	B15	_VMIU_DET	VMIU Detection	B11	FLASH_CE-	Flash Memory Enable Master Switch
	B16	_AAFU_DET	AAFU Detection	B12	FLASH_CLE	Flash Memory Command Latch Enable
				B13	FLASH_ALE	Flash Memory Address Latch Enable

Table 3.1.10 Pin assignment of CN5

※NOTE

(a) Inverted 2MHz signal from ACT2

(b) 8Khz Long frame signal from ACT2

5) RS232C connection

There is a serial port in MBU for diagnosis. It is connected to the 1st UART port of CPU. The serial port supports all hardware flow control signals such as RTS, CTS, DTR, and DSR.

Pin Number	Pin name	Description	Pin Number	Pin name	Description
1	CD	Reserved	6	DSR	Data Set Ready
2	RD	Received data	7	RTS	Request to Send
3	TD	Transmitted data	8	CTS	Clear To Send
4	DTR	Data Terminal Ready	9	RI	Reserved
5	SG	Signal Ground			

Table 3.1.11 Pin assignment of UART (CN8)

6) PSU installation

CNNT	Pin Number	Pin name	Description
CN7	1	GND	Ground
	2	VO/VF	VO power: 30V for PSU (Feeding Voltage)
	3,4	+5V	+5V power
	5	-5V	-5V power
	6,7	GND	Ground

Table 3.1.12 Pin assignment of CN7

3.2 EMBU (Expansion Main Board Unit)

3.2.1 General

The EMBU is the Expansion Main Board Unit of ipLDK-60. It provides basic CO, Station and extension interface circuits, physical connection with various boards, and also miscellaneous functions.

The EMBU is composed of a main processor and its peripheral circuits, the three CO) interface circuits, 8 hybrid circuits that are selected to DKT or SLT ports by pin assignment, 8 digital line interface circuits and 8 single line interface circuits, a Ring Generator circuit, a system battery backup circuit

Basically, the EMBU provides the capacity of 3/08, that is, the three CO interface circuits and the eight extension terminal interface circuits that are composed of 8 DKT ports and 8 Hybrid ports.

The system features can be added by installing function boards at connectors that are prepared on the EMBU.

3.2.2 Block Diagram

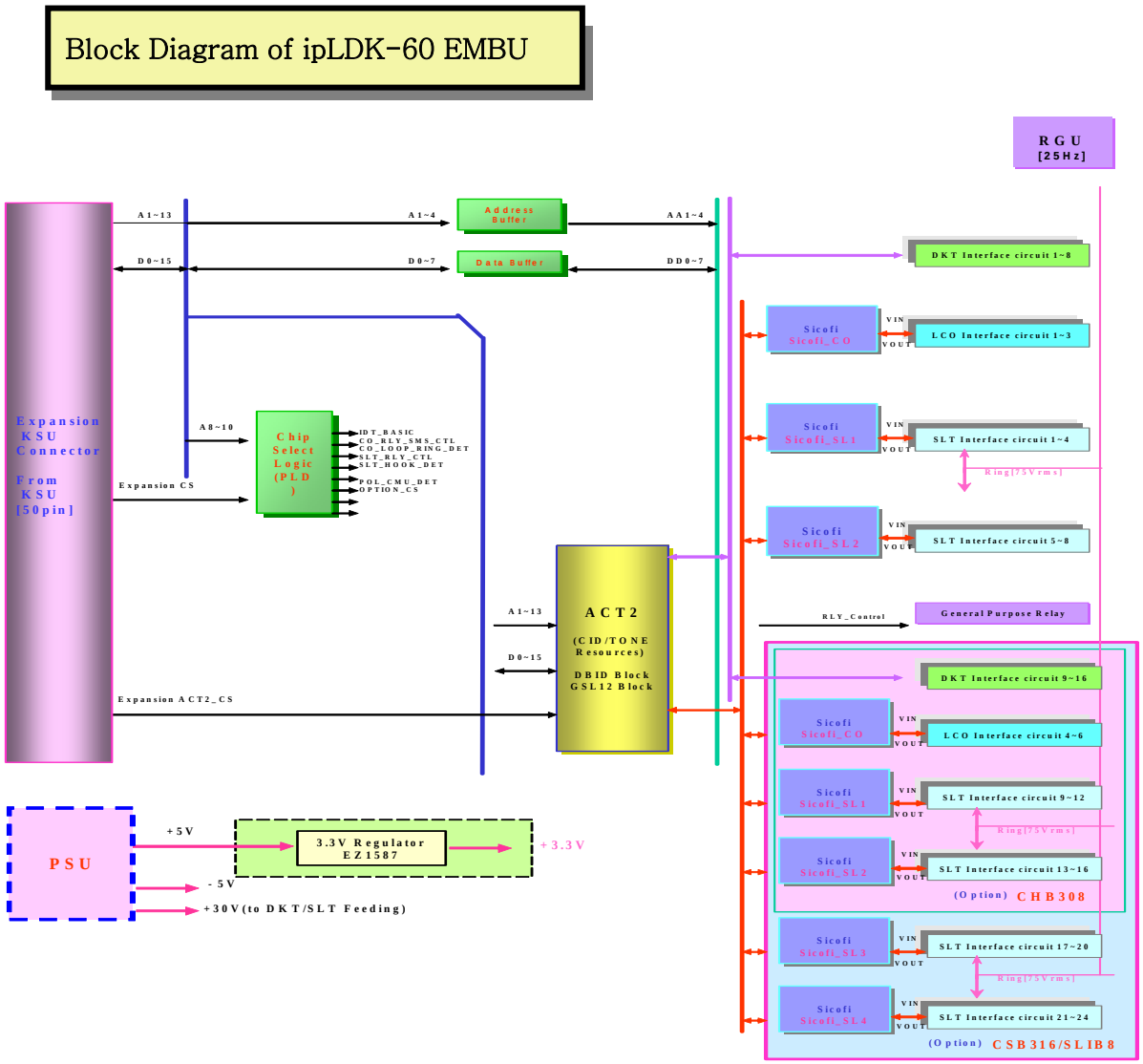


Figure 3. 2.1 Blockdiagram of EMBU

3.2.3 Circuit description

There are five kinds of option boards such as CHB308, CSB316, SLIB8 and CMU50/12PR. This board doesn't have ports for RS-232C and connectors for VMIU, E1HB8 and MODU. So, all features of the EMBU are exactly the same as the MBU except the features of RS-232C, Voice Mail Interface, E1HB8 . Please, refer to the MBU part.

3.2.4 Meaning of Connectors and LEDs

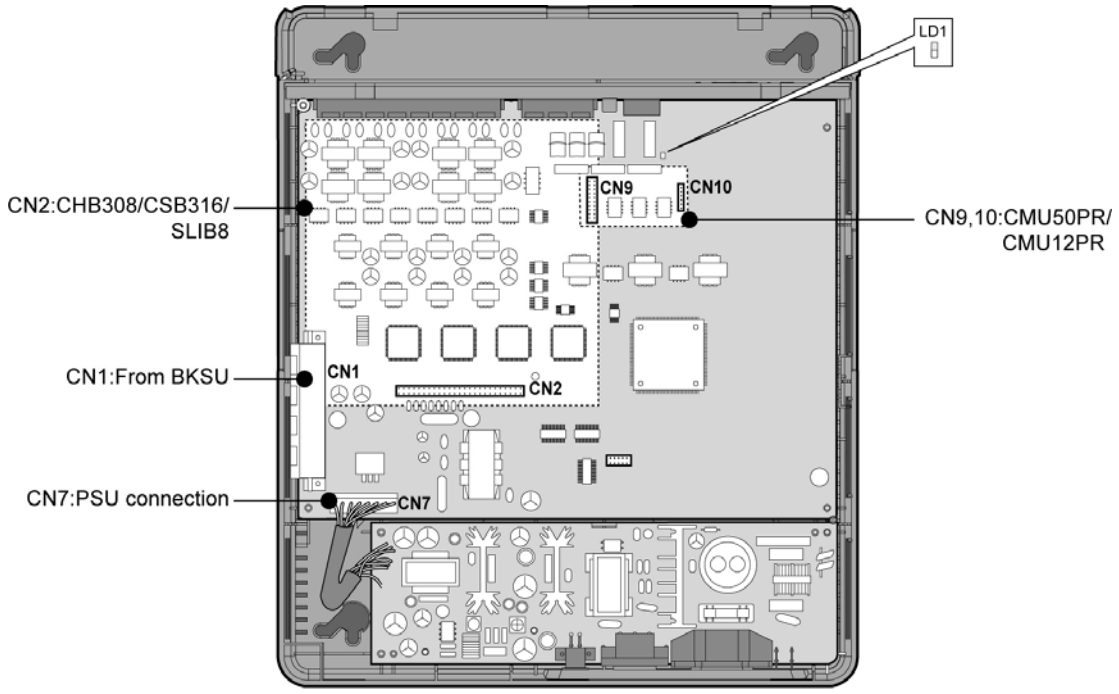


FIGURE 3.2.2 EMBU

NOTE—

- *When AC Power was failed, the last SLT port on EMBU will be connected to CO1 automatically.*
- *Even though the EKSU power is turned off while both systems(BKSU and EKSU) are working properly, the BKSU will restart automatically.*

The EMBU is installed in the KSU and provides various kinds of connectors and RJ11 modular jacks for the connection of peripheral boards and miscellaneous functions (refer to Figure 3.2.3 and Table).

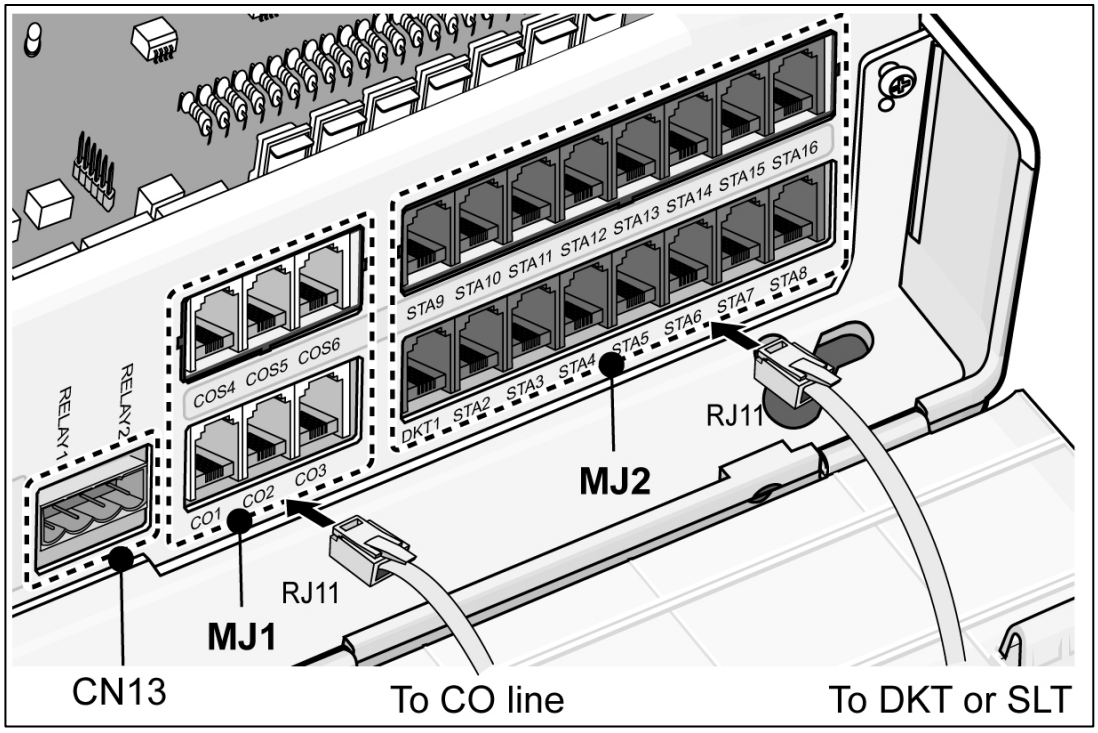


FIGURE 3.2.3 EMBU CONNECTION PORTS

CONNECTOR/MODULAR JACK/SWITCH FUNCTIONS

SWITCH/CONNECTOR	FUNCTIONS	REMARK
CN1	KSU Connection from Basic KSU with Link cable	50Pins
CN2	CO and Extension board (CHB308, CSB316, SLIB8) installation	50Pins
CN9 & CN10	CMU50PR/CMU12PR installation	6 & 8 Pins
CN13	External Relay contact	4 Pins
CN7	PSU connection	7Pins
MJ1	3 CO connection	3 Arrays
MJ2	8 DKTs or 8SLTs connection	8 Arrays

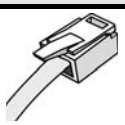
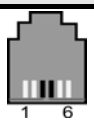
LED INDICATIONS

LED	MEANING
LD1 (Blue)	Periodic Toggle—ON, 300msec; OFF, 300msec.

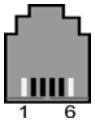
3.2.3.1 Modular Jack (MJ1 – MJ3) Pin Assignment

EMBU MJ1(CO)

EMBU MJ1 – 1,2,3

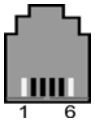
CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
		1,2	N/A
		3,4	CO-T, CO-R
		5,6	N/A

EMBU MJ2 – 1,2,3,4,5,6,7,8 (EXTENSION)

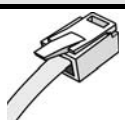
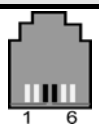
CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1	N/A
		2	DKT-T
		3,4	SLT-T, SLT-R
		5	DKT-R
		6	N/A

NOTE—When installing the DKT or SLT on Hybrid Ports (MJ2-1,2,3,4,5,6,7,8), keep the above pin assignment. Otherwise, the DKT or SLT will not operate normally.

TERMINAL DKT

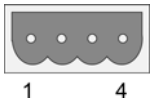
CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1	N/A
		2	RING
		3,4	Reserved
		5	TIP
		6	N/A

TERMINAL SLT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
		1,2	N/A
		3,4	TIP, RING
		5,6	N/A

CN13 Pin Assignment (Relay Contact)

CN13

CONNECTOR	NO	SIGNAL NAME
4 PIN 	1	Relay 1-pin1
	2	Relay 1-pin2
	3	Relay 2-pin1
	4	Relay 2-pin2

3.3 CHB308 and CSB316

(3CO & 8Hybrid Board, 3CO & 16Single Line Interface Board)

3.3.1 General

The CHB308, 3CO and 8 Hybrid (8 DKTs & 8SLTs) Board, provides an analog interface between the outside CO or PABX lines and the system. The CSB316, 3CO and 16 Single Line Interface Board, also provides an analog interface between the outside CO or PABX lines and the system. Each CO/PABX line interface circuit provides the A/D and D/A conversions for audio and signaling to and from the ISC bus of system and the CO/PABX line. These boards can be inserted in connector, CN2, on the MBU or EMBU.

3.3.2 Block Diagram

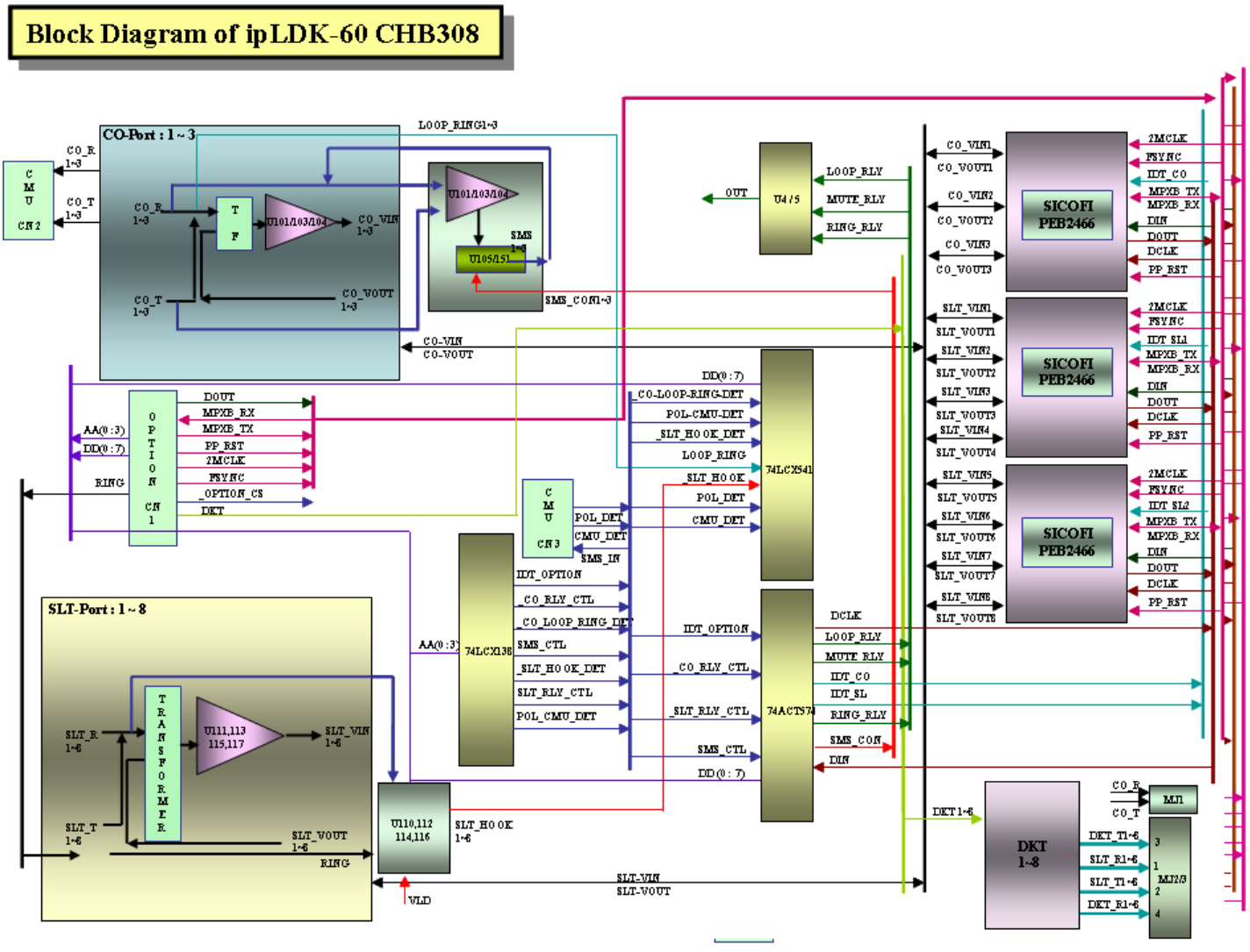


Figure 3.3.1 Block diagram of CHB308

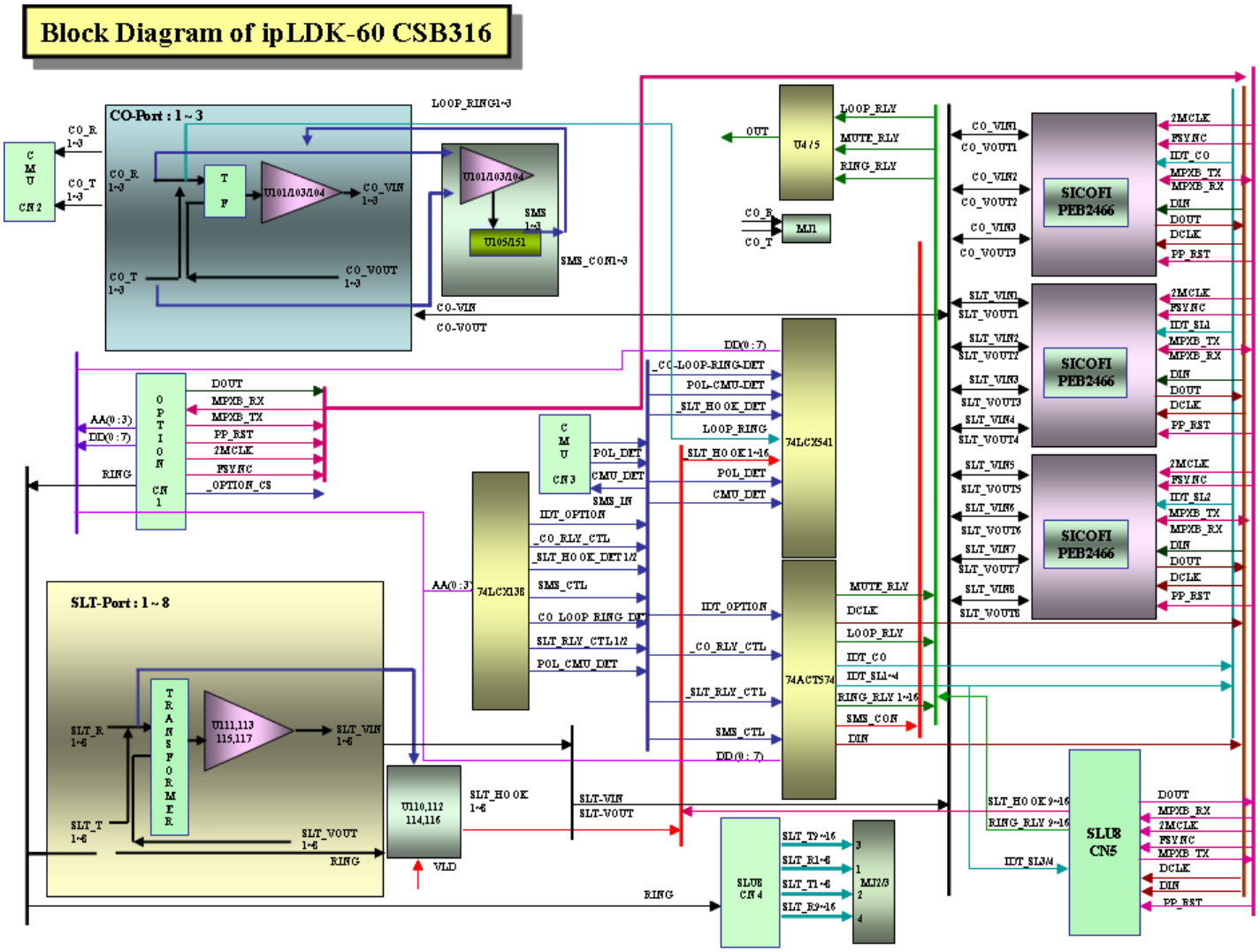


Figure 3.3.2 Block diagram of CSB316

3.3.3 Circuit description

Digital signal part

Digital signal part of CHB308 and CSB316 boards consist of SICOFI (U1, U2, U3) for A/D conversion (voice signal) and Address decoding parts, Relay control parts, loop & ring read buffer. SICOFI (U1, U2, U3) is IC which convert voice into digital PCM data and reverse function. But, the function of PCM data switching exist in ACT2 IC on MBU. IC U6 is used for address decoding. U7 is used for control of SICOFI. IC U8 and U4 are used for loop relay control and SMS switch control for 3CO. IC U9 is used for CO Loop & ring signal detection. IC U10 and U5 are used for SLT ring relay. IC U11 is used for SLT off-hook signal detection.

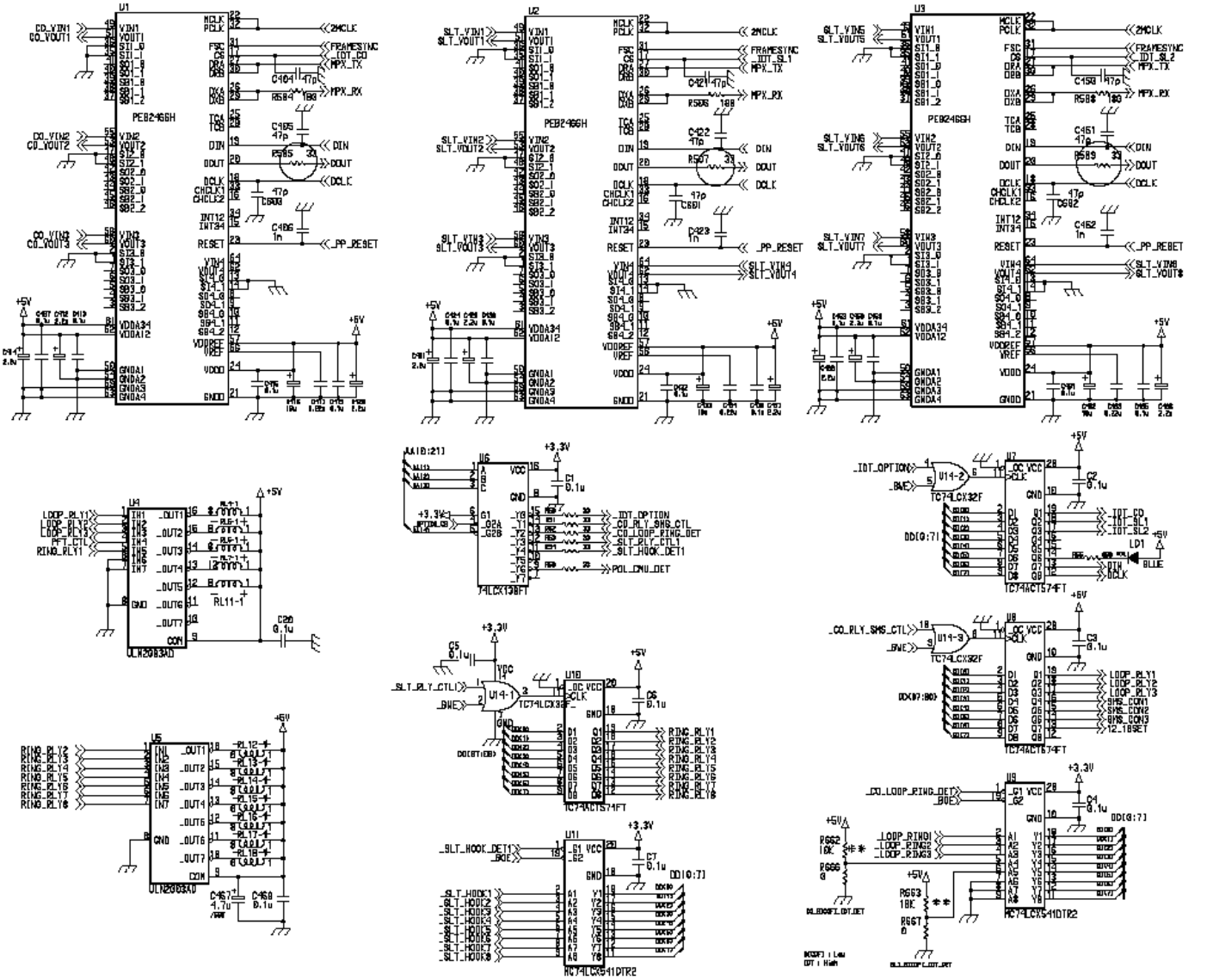
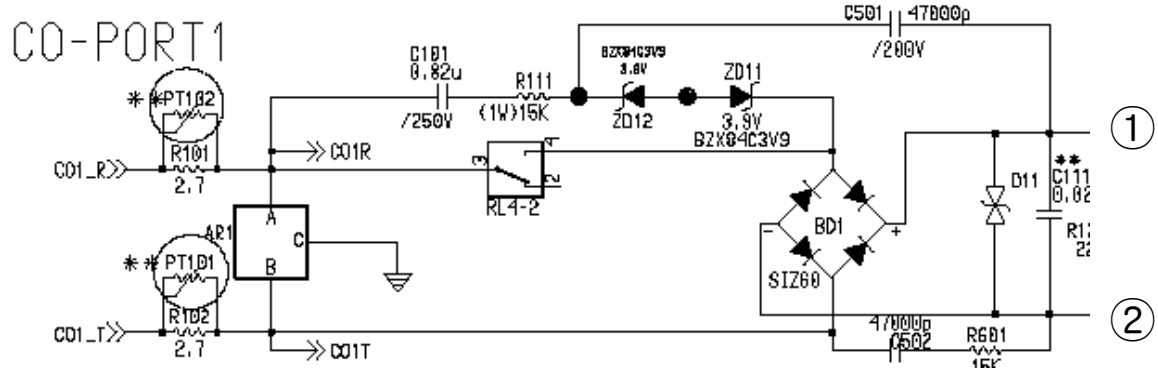


Figure 3.3.3 Digital part

Analog signal part

CO analog signal part of CHB308 and CSB316 consist of DC loop circuit and loop & ring detection circuit, Codec interface circuit. The port 1 is used for circuit description as an example.



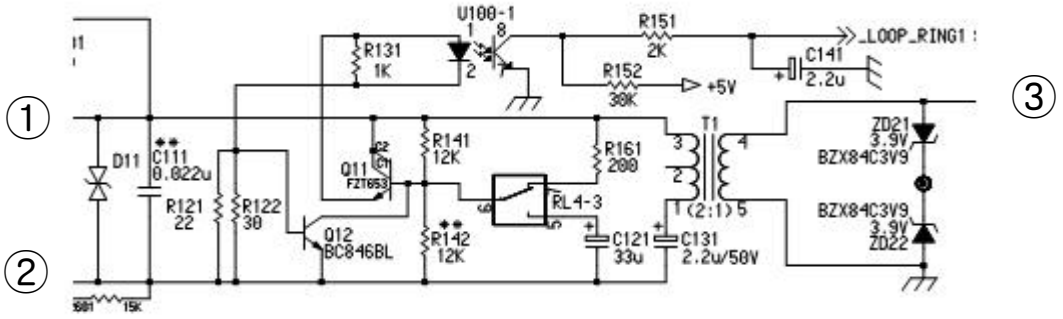


Figure 3.3.4 SLT interface circuit

The line protection circuitry consists of one bridge diode (BD1) between the Tip with Ring input and Fusible resistor (R101, R102) for high power current and arrestor for limitation high voltage. The one relay circuit provide suppression of transients and input to the Ring Detection circuit. The Ring signal passes through C101, R111 and C501. And then, finally Ring signal arrive at U100-1 for detection. When the Ring comes in CHB308 or CSB316, RL4-2 is open. If you want to connect CO, RL4-2 will be short to 'RING' line. So, DC loop is connected through Q12. U100-1 is used for DC loop and Incoming Ring detection. The resistor R141 and Q12 are used for DC loop current limit according to DC voltage.

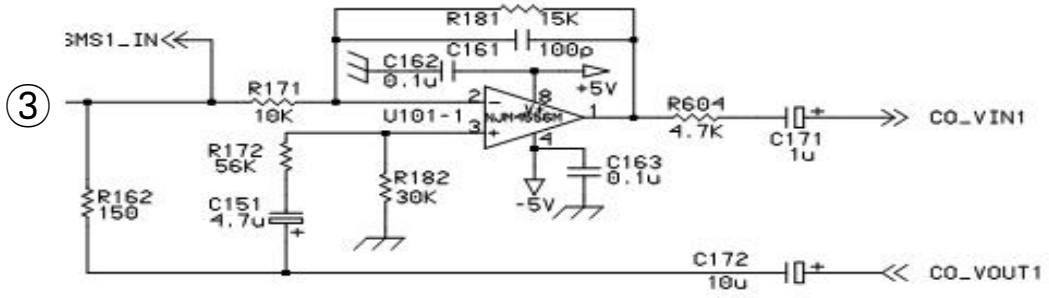


Figure3.3.5 CODEC interface circuit

Transformer T1 transfers two wire voice signals to one way voice signal. Moreover, the function of Transformer is the isolation of the system digital side from CO line analog side. The incoming voice signal pass through OP-AMP which is amplified signal and prevented hauling with R172, C151. The outgoing voice signal pass through C172 and R162 to transformer.

Impedance matching is incorporated on the secondary winding of the audio transformer through appropriate RC networks with SICOFI(U1). CO_VIN1and CO_VOUT1 nodes are connected to the analog interface of SICOFI (U1).

SICOFI(U1) provides many functions, which are A/D conversion of voice signal, impedance matching, analog amplification/attenuation, trans-hybrid balancing, PCM highway interface, and etc. For more information about SICOFI refer to the datasheet of PEB2466 manufactured by Infineon.

SLT - Analog signal part

SLT analog signal part of CHB308 and CSB316 are composed of SLT line interface and protection circuit, +36V power feeding circuit, current limiting circuit, SICOFI interface circuit and hook-sensing circuit. The port 1 is used for circuit description as an example.

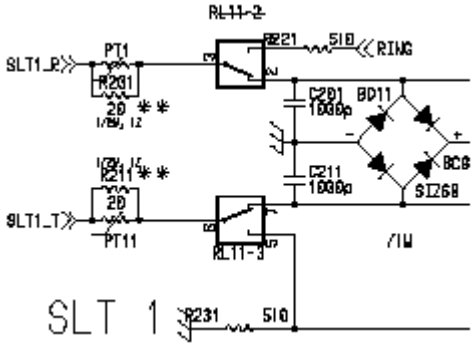


Figure 3.3.6 The SLT line interface and protection part

The line protection circuitry consists of one bridge diode(BD1) between the Tip with Ring input and Relay(RL11-2) for providing the ring signal and making the DC loop

As the figure shown below, +36V power feeding part are connected to SLT line interface and protection part. So +36V power is supplied to SLT through resistors and transistors(Q21 and Q31), the SLT line interface and protection circuit. The resistors(R656, R701 and R671), transistors(Q41 and Q101), capacitor(C728) and zener diode(ZD10) makes the loop current be limited.

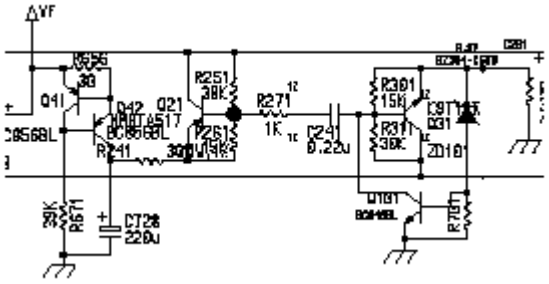


Figure 3.3.7 +36V power feeding and current limiting circuit

The SICOFI interface circuit is comprised T11(matching transformer), U111-1(amplifier) and other passive devices. The main functions of this circuit are the isolation of the system side from SLT line side and the gain conversion of voice signal. The audio transformer, T11, operates in a non-saturated condition with DC blocking capacitor, C261. Impedance matching is incorporated on the secondary winding of the audio transformer through appropriate RC networks with SICOFI.

VIN1 and VOUT1 nodes is connected to the analog interface of SICOFI(U2).SICOFI(U2) provides many functions, which are A/D conversion of voice signal, impedance matching, analog amplification/attenuation, trans-hybrid balancing, PCM highway interface and etc. For more information about SICOFI refer to the datasheet of PEB2466 manufactured by Infineon.

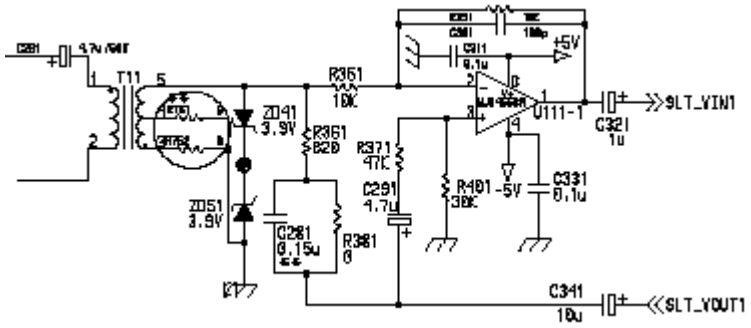


Figure 3.3.8 The SICOFI interface circuit

The key devices of the hook-sensing circuit are U3(LM2903; comparator) and VLD
If the called party hooking off, after comparing VLD, SLT_HOOK1 signal becomes low. So the system detects the hook-off status(_SLT_HOOK1 signal is active low).

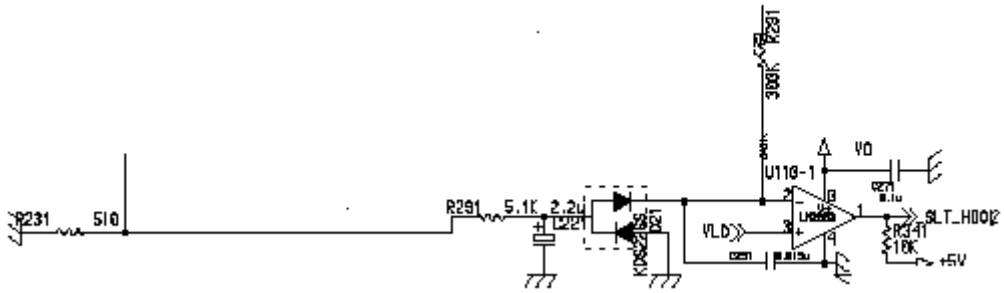


Figure 3.3.9 The hook-sensing circiut

DKT- Digital Terminal part

The digital line interface circuit is composed of the GSL12 block of ACT, a matching transformer, capacitors, resistors and a posistor. It provides a connection with two wires to one digital terminal. Capacitors and diodes are used for protecting line interface circuit against ESD or lightning surge.
It provides +30V power to the digital terminal through the transformer and the posistor is used to protect the over current due to line short. The DKT TX interface line of the GSL12 block of ACT2 on the MBU are output terminals and used to transmit a digitized voice and data to the digital terminals via the transformer. And the DKT RX lines of the GSL12 block of ACT2 are input terminals and are used to receive a digitized voice and data from the digital terminals.

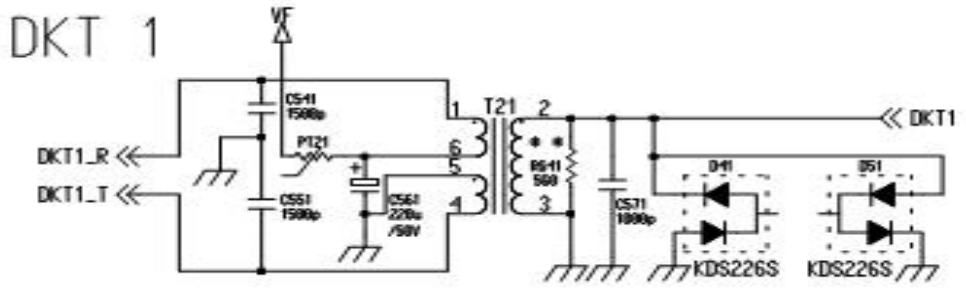


Figure3.3.10 Digital line interface circuit for CHB308

3.3.4 Meaning of Connectors

The CHB308 has three (3) connectors for installation of CMU50PR(or CMU12/16PR) and connection with MBU or EMBU.

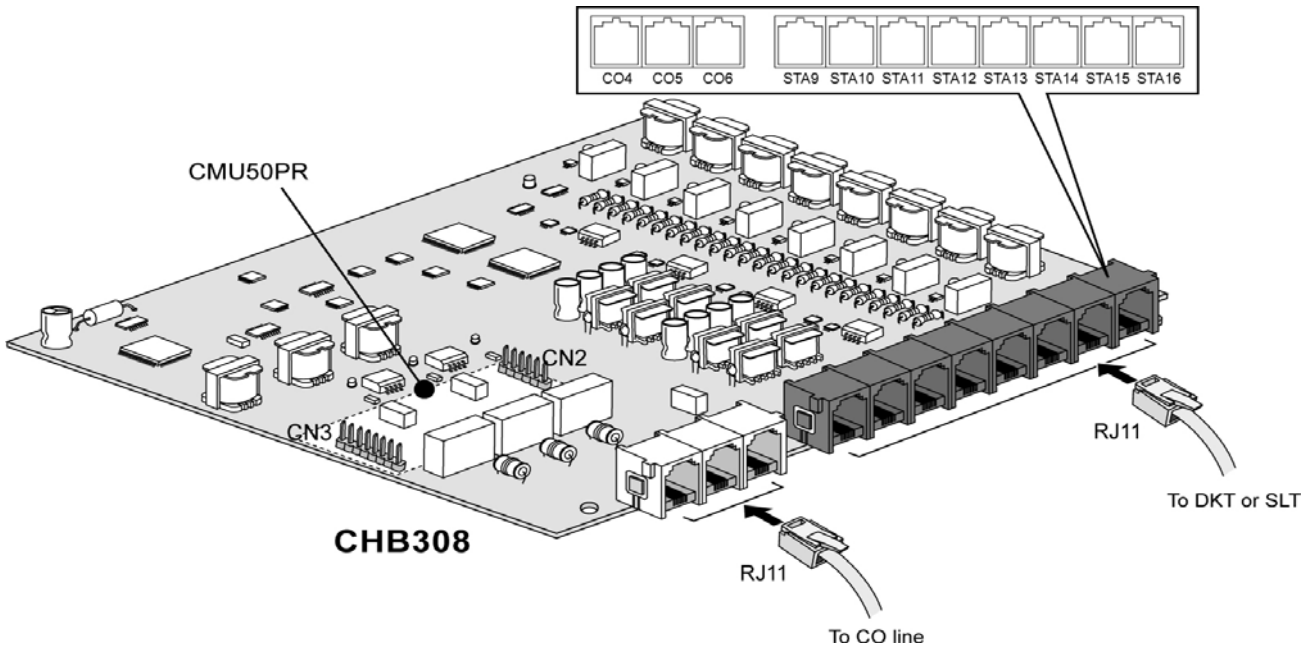


Figure 3.3.11 CHB308 Layout

Pin assignments of CN1, CN2 and CN3 for CHB308

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN1	A1,A10~A12,A21,B5,B11	OPEN	Reserved	B4	PFT-CTL	PFT control signal
	B1	VD	Feeding voltage	B6	MPX_RX1	PCM bus RX
	B2	+5V	+5V Power	B7	MPXB_TX1	PCM bus TX
	A3	-5V	-5V Power	B8	_WE	Write Enable
	A2,A4,A23,A25,B3,B23	GND	Ground	B9	_BOE	Out Enable
				B10	_PP_RESET	PP_Reset
	A9	+3.3V	+3.3V Power	B12	_OPTION_CS	Option Chip Select
	A5,A6,A7,A8	AA(1)~AA(4)	Address	B13	2MCLK	2 MHz Clock for Option
	A13~A20	DD(0)~DD(7)	Data	B14	FRAMESYNC	Framesync for Option
	A22	DOUT	Data out from Sicofi/IDT	B15~B22	DKT9~DKT16	DKT for Option
	A24	RING	Ring	B24,B25	_OPTION_DET1/2	Option Detection 1 & 2

CNNT	Pin Number	Pin name	Description
CN3 (CMU50PR/ CMU12PR)	A1	POL_DET1	Polarity Reversal Detection 1
	A2	CMU_DET1	CMU Detection 1
	A3	POL_DET2	Polarity Reversal Detection 2
	A4	CMU_DET2	CMU Detection 2
	A5	POL_DET3	Polarity Reversal Detection 3
	A6	CMU_DET3	CMU Detection 3
	A7	+5V	+5V power
	A8A9,A10,B10	GND	Ground
	B1,B2	CMU_BOARD1/2	CMU Detection 1 & 2
	B3	SMS_IN1	CID Signal path 1
	B4	SMS_IN2	CID Signal path 2
	B5	SMS_IN3	CID Signal path 3
	B6~B8	OPEN	Reserved
	B9	12_16SET	12, 16 select
CN2 (CMU50PR/ CMU12PR)	1	CO1R	CO 1 Ring
	2	CO1T	CO 1 Tip
	3	CO2R	CO 2 Ring
	4	CO2T	CO 2 Tip
	5	CO3R	CO 3 Ring
	6	CO3T	CO 3 Tip

Table 3.3.1 Pin assignment of CN1, CN2 and CN3 for CHB308

The CSB316 has five (5) connectors for installation of CMU50PR, SLU8 and connection with MBU or EMBU.

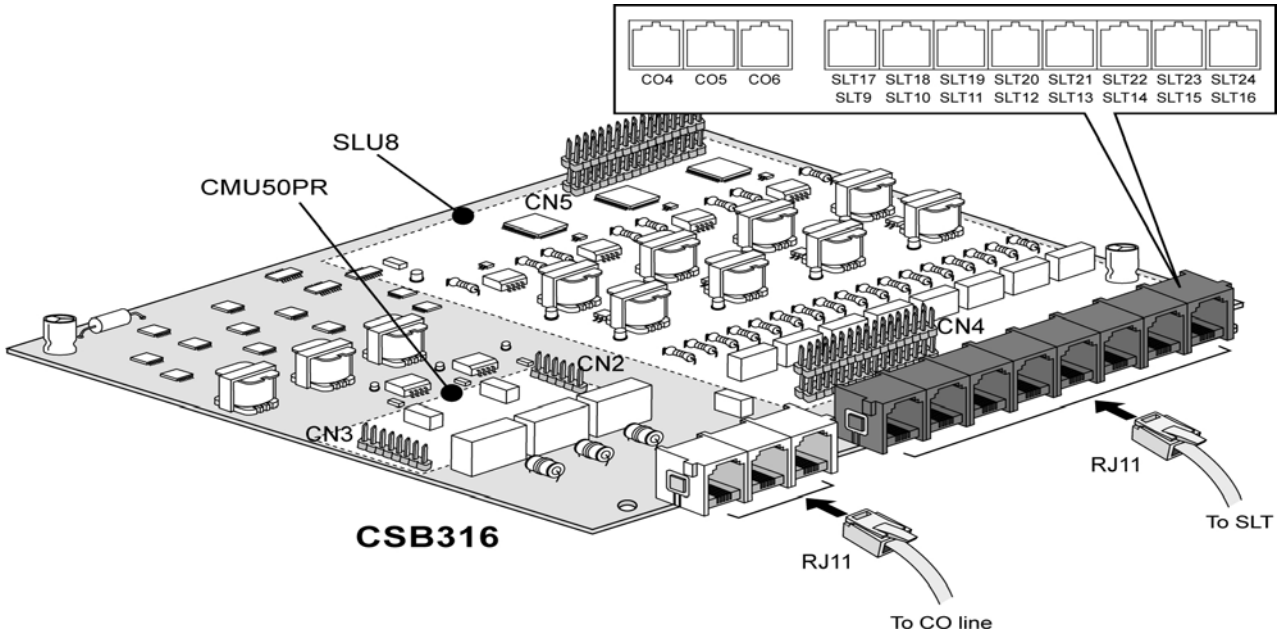


Figure 3.3.12 CSB316 Layout

Pin assignments of CN1, CN2 and CN3 for CSB316

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN1	A1,A10~A12,A21,B5,B11	OPEN	Reserved	B4	PFT-CTL	PFT control signal
	B1	VD	Feeding voltage	B6	MPX_RX1	PCM bus RX
	B2	+5V	+5V Power	B7	MPXB_TX1	PCM bus TX
	A3	-5V	-5V Power	B8	_WE	Write Enable
	A2,A4,A23,A25,B3,B23	GND	Ground	B9	_BOE	Out Enable
				B10	_PP_RESET	PP_Reset
	A9	+3.3V	+3.3V Power	B12	_OPTION_CS	Option Chip Select
	A5,A6,A7,A8	AA(1)~AA(4)	Address	B13	2MCLK	2 MHz Clock for Option
	A13~A20	DD(0)~DD(7)	Data	B14	FRAMESYNC	Framesync for Option
	A22	DOUT	Data out from Sicofi/IDT	B15~B22	DKT9~DKT16	DKT for Option
	A24	RING	Ring	B24,B25	_OPTION_DET1/2	Option Detection 1 & 2

CNNT	Pin Number	Pin name	Description
CN3 (CMU50PR/ CMU12PR)	A1	POL_DET1	Polarity Reversal Detection 1
	A2	CMU_DET1	CMU Detection 1
	A3	POL_DET2	Polarity Reversal Detection 2
	A4	CMU_DET2	CMU Detection 2
	A5	POL_DET3	Polarity Reversal Detection 3
	A6	CMU_DET3	CMU Detection 3
	A7	+5V	+5V power
	A8A9,A10,B10	GND	Ground
	B1,B2	CMU_BOARD1/2	CMU Detection 1 & 2
	B3	SMS_IN1	CID Signal path 1
	B4	SMS_IN2	CID Signal path 2
	B5	SMS_IN3	CID Signal path 3
	B6~B8	OPEN	Reserved
	B9	12_16SET	12, 16 select
CN2 (CMU50PR/ CMU12PR)	1	CO1R	CO 1 Ring
	2	CO1T	CO 1 Tip
	3	CO2R	CO 2 Ring
	4	CO2T	CO 2 Tip
	5	CO3R	CO 3 Ring
	6	CO3T	CO 3 Tip

Table 3.3.2 Pin assignment of CN1, CN2 and CN3 for CHB308

Pin assignments of CN4 and CN5 for SLU8 Connection

CNNT	Pin Number	Pin name	Description
	A1~A8	SLT9_R ~ SLT16_R	SLT9 ~ SLT16 Ring
CN4	B1~B8	SLT9_T ~ SLT16_T	SLT9 ~ SLT16 Tip
	A10,	SLU_COEDC_DET	SLU8 CODEC
	A11,B11	VD	+30V power
	A12,A13,B12,B9, B10,B12	GND	Ground
	B13	RING	SLT Ring
	A9	OPEN	Reserved

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN5	A1	-5V	-5V Power	B1	+5V	+5V Power
	A2~A9	_SLT_HOOK9 ~ _SLT_HOOK16	SLT Hook9 ~ SLT Hook16	B2~B9	RING_RLY9 ~ RING_RLY16	Ring Relay9 ~ Ring Relay16
	A10	2MCLK	2 MHz Clock	B10	DIN	Data In
	A11	FRAMESYNC	Framesync for SLU8	B11	DCLK	Data Clock
	A12	_IDT_SL3	IDT CS for U2 on SLU8	B12	DOUT	Data out
	A13	_IDT_SL4	IDT CS for U3 on SLU8	B13	_PP_RESET	PPReset for SLU8
	A14	MPXB_TX	PCM bus TX	B14	MPX_RX	Multiplexed bus RX
	A15	8SLU_DET	SLU8 Detection	B15	GND	Ground

Table 3.3.3 Pin assignment of CN1, CN2, CN3, CN4 and CN5 for CSB316 (Including SLU8)

3.4 SLIB8 (Single Line Interface Board-8Port)

3.4.1 General

The SLIB8, 8 Single Line Interface (8SLTs) Board, provides an analog interface function of the system. The PCB of this board is exactly the same as it of CSB316. So if there is any problem of SLIB8, please refer to the CSB316 part.
This board can be inserted in connector, CN2, on the MBU or EMBU.

3.4.2 Block Diagram

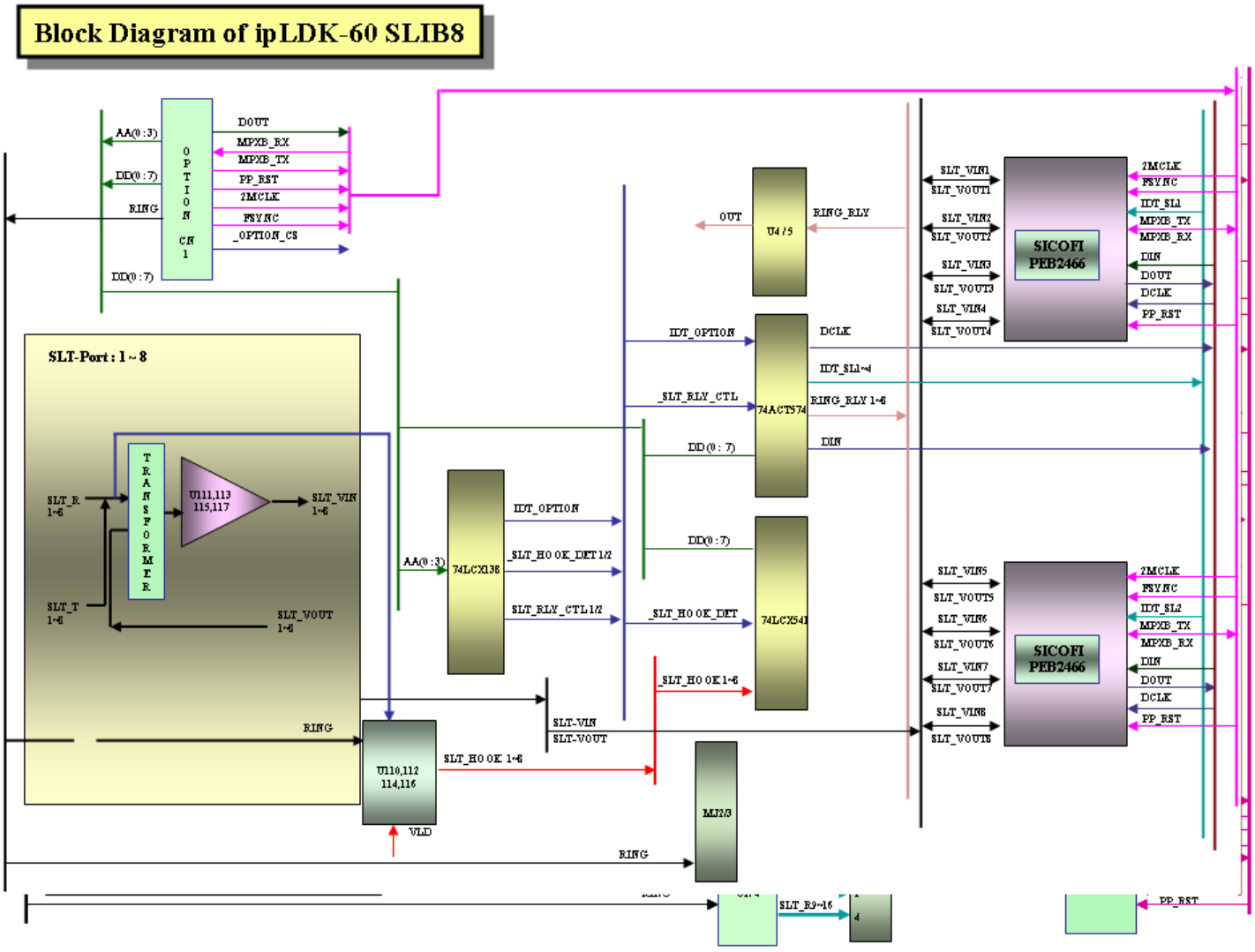


Figure 3.4.1 Block diagram of SLIB8

3.4.3 Circuit description

A. Digital signal part

Digital signal part of SLBI8 boards consist of SICOFI (U2, U3) for A/D conversion (voice signal) and Address decoding parts, Relay control parts. SICOFI (U2, U3) is IC which convert voice into digital PCM data and reverse function. But,

the function of PCM data switching exist in ACT2 IC on MBU. IC U6 is used for address decoding. U7 is used for control of SICOFI. IC U10 and U5 are used for ring relay. IC U11 is used for off-hook signal detection.

B. Analog signal part

Analog signal part of SLIB8 consists of ring detection circuit and Codec interface circuit.
Circuit is the same of CHB308 and CSB316 SLT analog signal part.

3.4.4 Meaning of Connectors

The CHB308 has three (3) connectors for installation of CMU50PR(or CMU12/16PR) and connection with MBU or EMBU

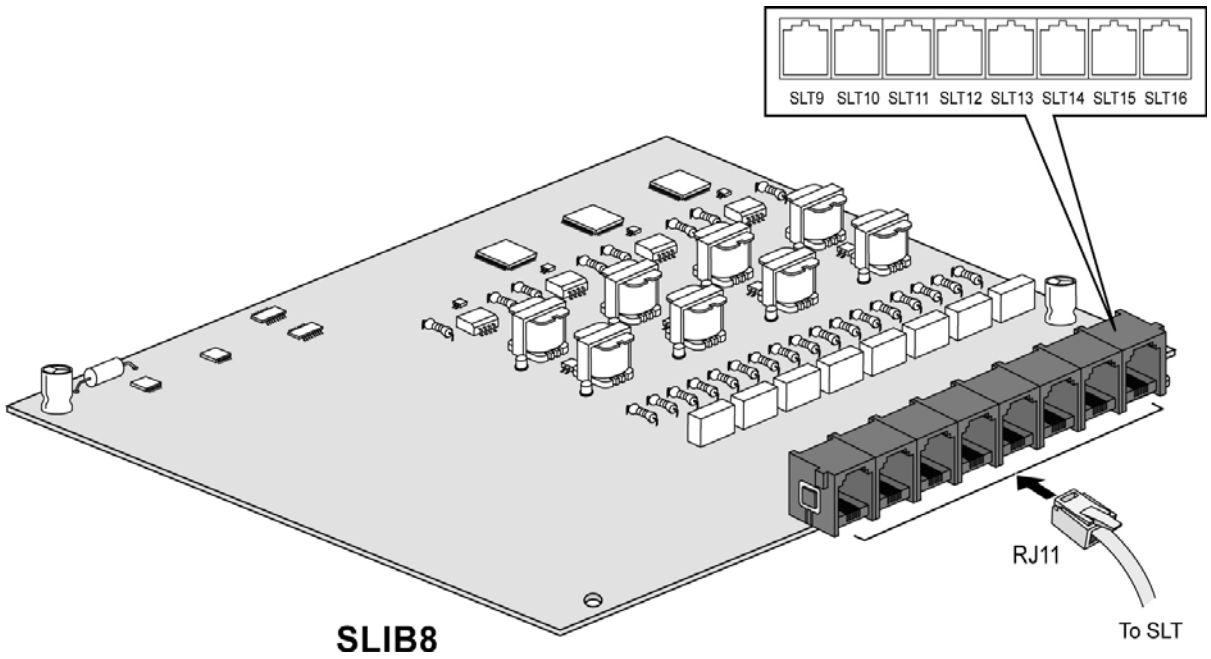


Figure 3.4.2 SLIB8 Layout

Pin assignments of CN1, CN2 and CN3 for CSB316

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN1	A1,B1	VF	Feeding voltage	B4	PFT_CTL	PFT Relay Control
	A2,B2	+5V	+5V Power	B6	MPX_RX	PCM bus RX
	A3	-5V	-5V Power	B7	MPXB_TX	PCM bus TX
	A4,A9,A10,A11	GND	Ground	B8	_BWE	Write Enable
	A12,A21,A23,A25			B9	_BOE	Out Enable
	B3,B5,B11,B23			B10	_PP_RESET	PP_Reset
	A5,A6,A7,A8	AA(1)~AA(4)	Address	B12	_OPTION_CS	Option Chip Select
	A13~A20	DD(0)~DD(7)	Data	B13	2MCLK	2 MHz Clock
	A22	DOUT	Data out	B14	FRAMESYNC	Framesync
	A24	RING	Ring	B24,B25	_OPTION_DET1/2	Option Detection 1 & 2

3.5 E1HB8(E1R2 digital trunk & 8 Hybrid Board)

3.5.1 General

The E1HB8 (E1R2 Digital trunk & 8 Hybrid Board) is a option board to interface IPLDK-60 system to digital trunk E1 line which transmits/receives the information of 30 subscriber lines by multiplexing it to digital stream, PCM 32 Slots.
E1HB8 is designed based on CCITT G.703/704/823 physically and can support pulse dialing, DTMF, and MFC-R2 register signaling which is based on ITU-T Q.440-480.
An extension board SLU8(Single Line interface Unit, 8 ports) is basically installed to connectors on the E1HB8 to provides 8 hybrid ports that mean supporting DKT(Digital Key Telephone) or SLT(Single Line Telephone) connection.
So, its maximum capacity is 30 trunk ports and 8 internal telecom ports.
E1HB8 is composed of main CPU, Memory circuit, Ethernet circuit, HDLC interface circuit, E1 line interface circuit, PLL(Phase Locked Loop), PCM switching circuit, and DSP circuit for MFC-R2 coder as shown in the following block diagram.

3.5.2 Block Diagram

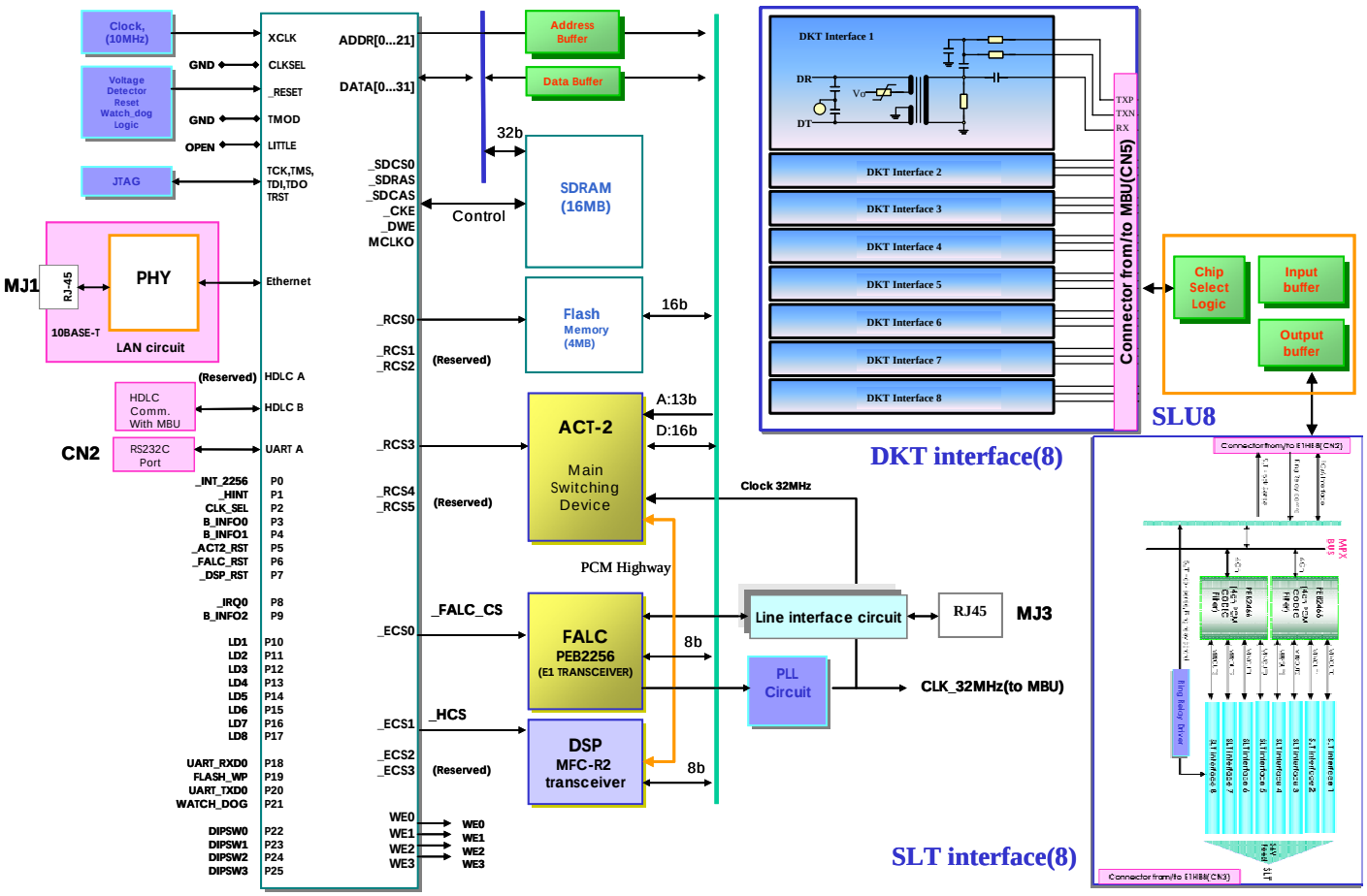


Figure 3.5.1 Block diagram of E1HB8

E1HB8 consists of CPU (Central Processing Unit, ARM7) and its peripheral circuits, Ethernet interface(10Mbps) and RS232C serial port, PCM switching and signaling control ASIC, ACT2, E1 trunk

interface circuit (FALC®56 chip),
DSP(TMS320VC5402) circuit, voltage regulator, reset circuit, and various connectors for extension board SLU8 and other functions.
An extension board SLU8 is composed of PCM CODEC, 8 DKT interface circuits, 8 SLT interface circuits, and +36V feeding voltage generation circuit.

3.5.3 Circuit Description

A. CPU & System Memory

The CPU,S3C4530A, is 16bit / 32bit RISC controller. It is manufactured using ARM7TDMI designed by advanced RISC machine Ltd so it has integrated micro processor and peripheral circuits which can be used for various applications. It is especially good for communication and networking system.
It consists of system manager block, 2 SCC controllers, 2 UART channels, 2 channel GDMA, 2 32bit timers, 18 different input / output part, interrupt controller, DRAM/SRAM controller, ROM controller and flash memory controller.
It has 8Kbyte cache / SRAM Ethernet controller too. S3C453A operates at 50MHz clock speed internally.
Flash memory(U33) operates at 70ns access time. CPU manipulates programmable register so that it can read and write data. There is a code in flash memory so CPU can control system, administration and call processing with the code. CPU can communicate with the main board that has main processor by HDLC protocol. Communication is accomplished by HDLC controller of CPU. Following table shows the memory size.

Memory	Size/each	Access time	Each	Size/total
Flash	32Mbits	70ns	1	4Mbytes
SDRAM	128Mbits	70ns	1	16Mbytes

Table 3.5.1 Memory size

System manager of CPU provides the four DRAM/SDRAM banks, the four External I/O banks, the six ROM/SRAM/Flash banks and etc. Each bank is set by corresponding registers and the below table shows system memory assignments for LDK-20 system.

Chip selection	Bus Width	Description
_SDCS0	32bits	SDRAM
_ECS0	8bits	FALC®56(U24, E1 transceiver, PEF2256)
_ECS1	8bits	DSP(U35,TMS320VC5402)
_ECS2	8bits	Reserved
_RCS0	32bits	Flash memory(U33)
_RCS1	8bits	Reserved
_RCS2	8bits	Reserved
_RCS3	16bits	PCM switching ASIC, ACT2(U34
others		Reserved

Table 3.5.2 Chip selection signals

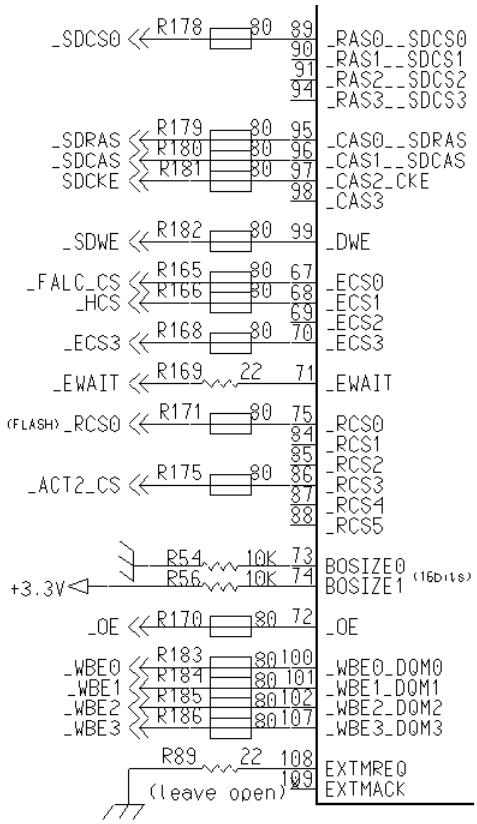


Figure 3.5.2 System memory interface

The S3C4530A has an Ethernet controller which operates at 10-Mbits per second in half-duplex or full-duplex mode. The Ethernet controller's MAC layer supports media independent interface(MII) that supplies the transmit and receive clocks of 2.5MHz at the 10-Mbit/s speed.

The MII is used to implement Ethernet connection with PC through modular jack, MJ1, for S/W development and board maintenance.

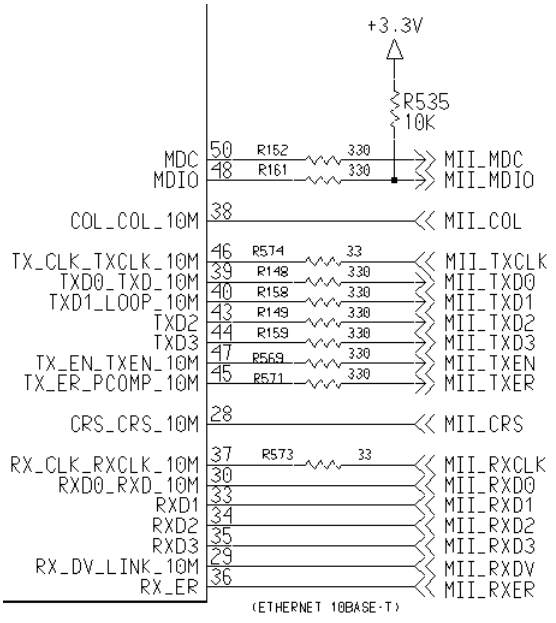


Figure 3.5.3 MII interface

The S3C4530A includes one time-slot-assignor(TSA), which provides flexible data path control between the two HDLCs and external interfaces. The TSA and HDLC channel A are not used at E1HB8.
The HDLC channel B is used for HDLC communication between main board(MBU) and peripheral board like E1HB8 and is routed to PCM switching device, ASIC ACT2, that has a role in carrying PCM voice data or control signals like HDLC.
The CPU has two UART blocks that provides two independent asynchronous serial I/O(SIO) ports. UART0 is used to monitor system operation by RS232C serial port and UART1 is reserved.
UART0 supports 19200bps speed but doesn't provide MODEM control signals such as DTR, DSR, RTS and CTS.
To monitor board operation by this serial port, it is necessary to use GDK-TRC tool that converts +5V signals to +12V signals and vice versa.
In addition, the CPU provides several external I/O ports that are used to read some functional signals like DIP switch information, board issues and name a few and to output control signals such as reset signal, LED indications and etc.

CPU Port	Description	IN/OUT	CPU Port	Description	IN/OUT
P0	FALC Interrupt decodingl	I	P8	Interrupt request	I
P1	DSP interrupt decoding	I	P9	Board info bit2	I
P2	PLL Clock selection	O	P10~P17	LED indications	O
P3	Board info bit0	I	P18	UART RX	I
P4	Board info bit1	I	P19	RESERVED	X
P5	ACT2 reset	O	P20	UART TX	O
P6	FALC reset	O	P21	WATCH_DOG	O
P7	DSP reset	O	P22~P25	DIP switch info 0~3	I

Table 3.5.3 CPU port signals

Local oscillator(X2) on E1HB8 generates 10MHz clock and provides it to CPU through Spread Spectrum clock generator (U14). PLL block of CPU multiplies it(EXTCLK) by 5 to generate 50MHz clock(MCLK0) for system operation.

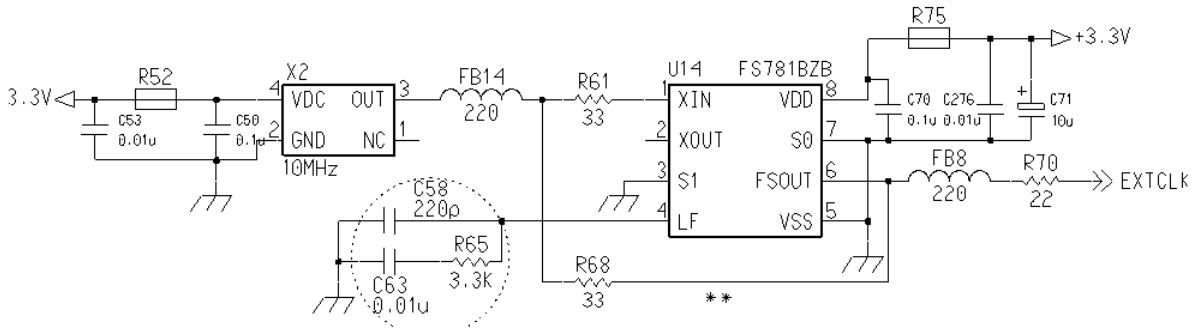


Figure 3.5.4 CPU Clock generation

B. Reset circuit

The Reset circuit generates reset pulse(_RESET) to CPU and flash memory from various control signals such as peripheral reset signal(_PP_RESET) of MBU, JTAG_RST of CPU emulator and other control signals.
The _PP_RESET signal is from main board where main CPU generates this signal for software reset or hardware reset is made by power detection circuit. The JTAG_RST signal is generated by CPU emulator during software development.
In addition, there are other reset signals provided by WATCH DOG, Power on reset, and board reset switch.
The 3V_DET signal is generated in case of pressing reset switch(SW3), system power ON, and power instability.
Power ON reset operates when +5V falls down to +4.65V in voltage detection IC(U2) to prevent uncertain operation. The output of voltage detection IC(3V_DET) and WDOG counter(U3) pulse signal are connected to OR-gate(U1-1) to make board reset signal(_RESET) eventually. WDOG reset signal is generated when CPU can't clear the counter(U3)

by WATCH_DOG periodically due to certain abnormal operation.

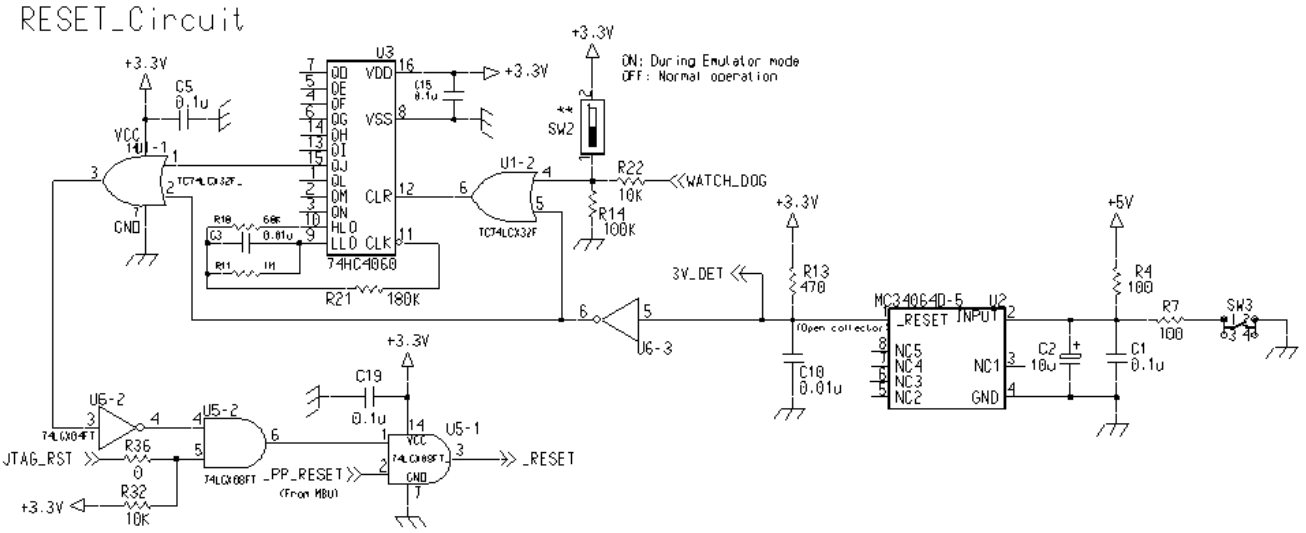


Figure 3.5.5 Reset circuit

C. Read & Write Buffer

There are several read/write buffers on the E1HB8 to buffer address, data and control signals and to convert +3.3V signals to +5V signals.

Octal buffers, U27~U29, are to drive address bus and read/write control signals and bi-directional buffers, U25~U26, are to buffer 16bits data bus. These buffers separate CPU and SDRAM memory with other peripheral devices such as FALC®56 chip, ASIC ACT2, DSP and flash memory and they are controlled by enable signal, _IO_BUS, that is generated by AND-gate(U17) from various chip selection signals.

Octal buffer, U13, converts +3.3V signals to +5V signals.

D. ACT2 and its peripheral circuits

The ACT-2 is a custom Mixed-Signal ASIC device used to construct a small to medium size digital key telephone system. It is designed to support most functions of the digital key telephone system by enhance existing ASIC device, ACT-1.

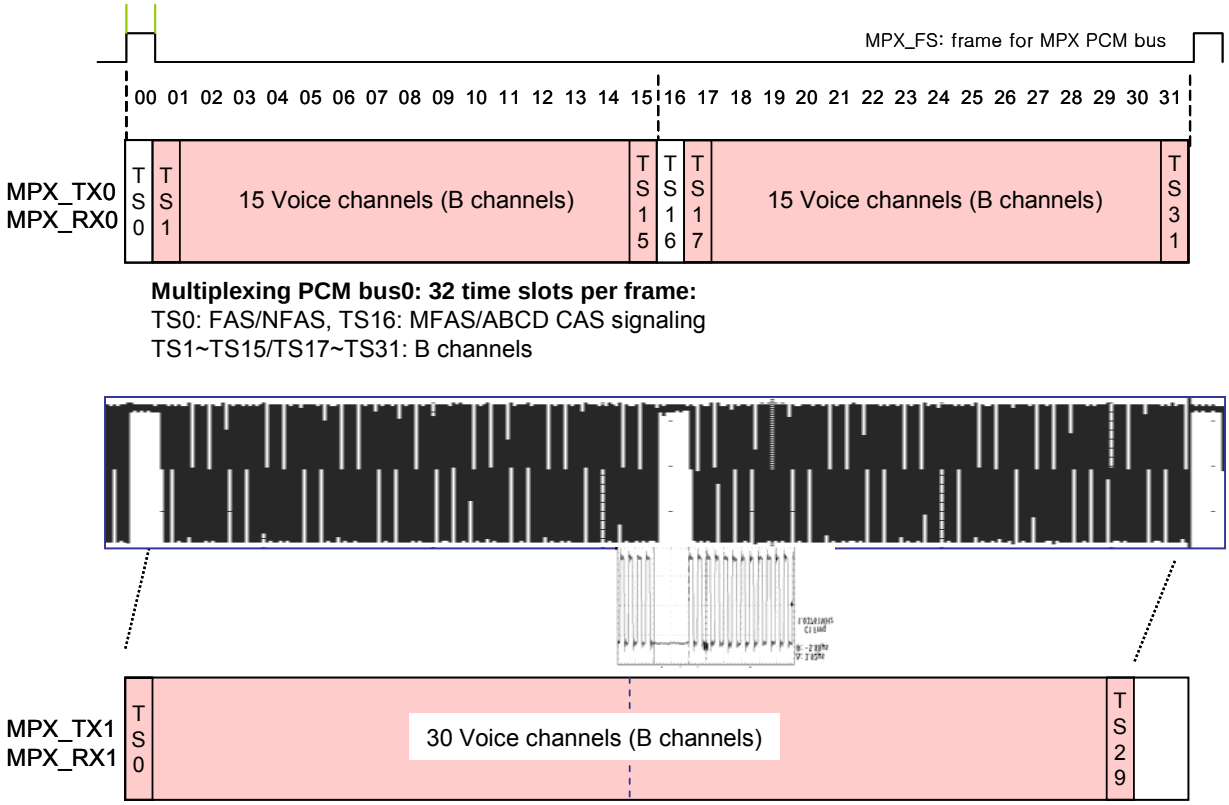
The ACT-2 device provides three major functions of GSXD, DBID and GSL12 as follows. And also, the ACT-2 has on chip DSP and memory to support DTMF, CPT and CID detection and generation.

- PCM switching (max. switching capacity : 12 highways - 576 ports)
- PCM gain modification (any desired gain value)
- Support channel based dedicated A/ u-law PCM and mixed PCM
- No restrictions between PCM conversion
- Support expansion system highways to increase system switching capacity
- Support Rx highway based line delay adjustment
- Internal Tone generation (max. 64 tones)
- PCM conference (192 summation locations)
- Internal FSK generation (max. 64 ports)
- DBID block has 36 port interface circuit (MPX mode operation)
- Two GSL12 blocks to support 24 ports digital terminal interface circuit
- Internal 100MHz 16-bit fixed point Zaram DSP and Program/Data Memory

In the application for E1HB8, the features of GSXD block and two DBIDII blocks are selected to implement PCM

switching and interfacing with peripheral PCM devices such as FALC®56 chip, DSP and etc.
The ACT-2 switches PCM channels between main switching device on the MBU and peripheral PCM devices in the E1HB8 and provides physical channel to carry HDLC packets between main CPU on the MBU and local processor of E1HB8 for high level data communications.
It also provides two PCM buses called MPX bus(MPX0 and MPX1) that are used to transmit/receive PCM data to/from E1 transceiver(FALC®56) and DSP with frame sync(8KHz) and data clock(2.048MHz) signals.
These PCM buses are composed of 32 time slots and 30 time slots out of them are used for PCM switching as shown in the Figure 3.1.8 MPX PCM highway.
Time slot 0 and 16 of MPX0 is reserved for E1 framing and CAS signaling implemented in FALC®56 chip and the reset 30 time slots are assigned to PCM voice switching.
The former 30 time slots of MPX1 are used for DSP that can generate and decode 30 channels of MFC-R2 signals at the same time.
The ACT-2 also generates various frame sync and data clocks to support all kind of PCM highway interfaces.
MPX0 PCM highway interface for FALC®56 is implemented by 8KHz frame sync(FRAME) and 8MHz data clock(CLK8M) and MPX1 PCM highway for DSP is by 8KHz frame sync(MPX_FS) and 2.048MHz data clock(CLK2M).
The ACT-2 in E1HB operates in slave mode and one in MBU operates in mater mode so EXP_FRAME signal is from master ACT-2 on the MBU to synchronize two devices.

Glue logic that is composed of U6, U19, and U20 implements control signals to interface ARM7 CPU with ACT-2.
ACT-2 requires read/write signal, R_W, to go to low before chip selection signal, CE, is activated and the data transmission ACK signal(_DTACK) generated from ACT-2 is routed to the wait signal of CPU after below logical computation.



Multiplexing PCM bus0: 32 time slots per frame:
TS0: FAS/NFAS, TS16: MFAS/ABCD CAS signaling
TS1~TS15/TS17~TS31: B channels

Multiplexing PCM bus1: 32 time slots per frame:
TS0~TS29: B channels for DSP that decodes/encodes MFC-R2 tones.

Figure 3.5.6 MPX PCM highway time slots assignment

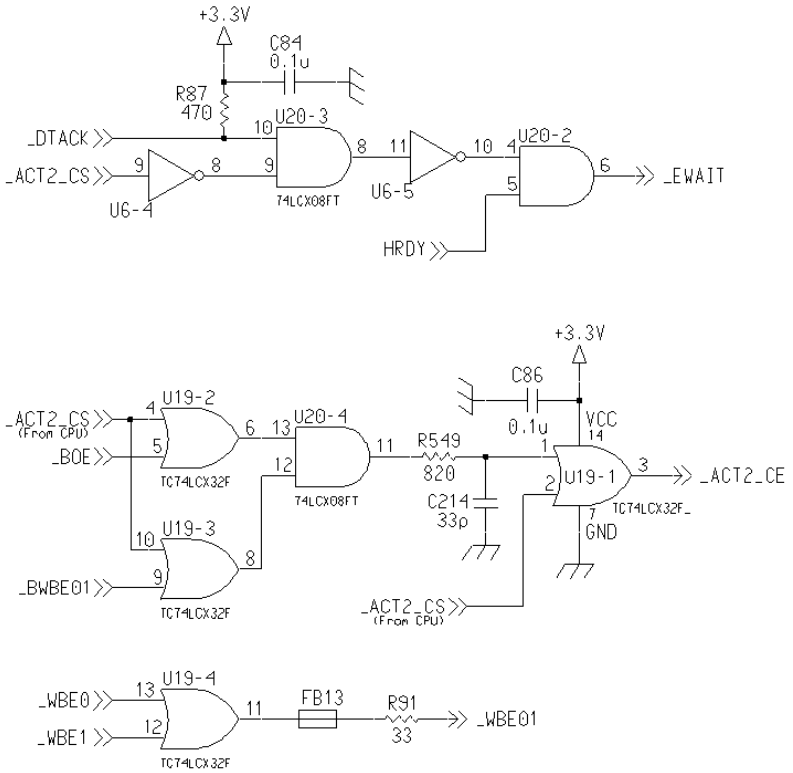


Figure 3.5.7 ACT-2 control signals

The ACT-2 generates several frame sync signals and data clocks to interface various PCM device as shown in the below table.

Signal name	Frequency	Description
MPX_FS	8KHz	PCM frame sync for DSP
H_CLK	512KHz	HDLC clock for HDLC channel B of CPU
CLK2M	2MHz	PCM data clock for DSP
CLK8M	8MHz	PCM data clock for FALC(E1 transceiver)
FRAME	8KHz	PCM frame sync for FALC(E1 transceiver)
EXP_FRAME	8KHz	Frame sync from master ACT-2 on MBU

Table 3.5.4 Clock and Frame signals

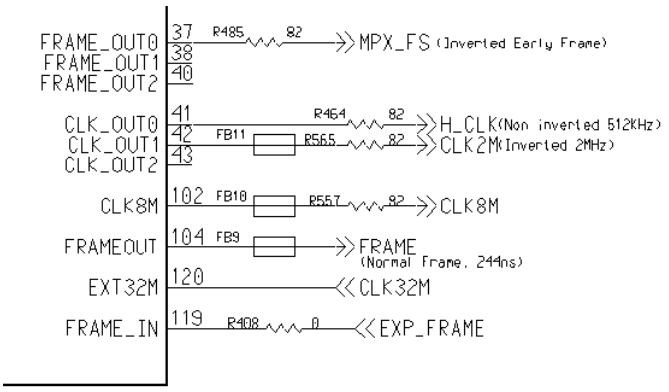


Figure 3.5.8 System clock generation circuit

E. DC/DC circuit

This circuit converts +5V power to +3.3V and +1.8V powers that are provided to CPU, ACT-2, DSP and so on. Power regulator U4 generates +1.8V and U7 provides +3.3V. ACT-2 and DSP requires +1.8V core voltage.

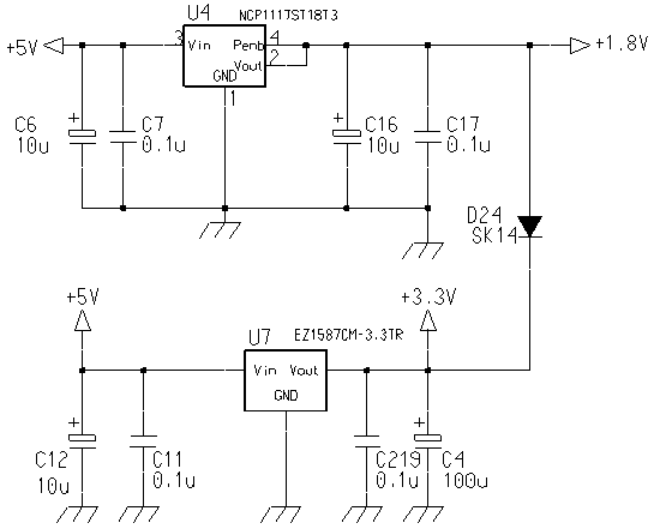


Figure 3.5.9 +3.3V/+1.8V generation circuit

F. E1 interfacing circuit

The FALC®56 Version 2.2 framer and line interface component is designed to fulfill all required interfacing between analog E1/T1/J1 lines and the digital PCM system highway, H.100/H.110 or H-MVIP bus for world market telecommunication systems.
The FALC®56 implements all of the standard framing structures for E1 or PCM 30(CEPT, 2.048 Mbit/s) carriers. The internal HDLC or CAS controller supports all signaling procedures including signaling frame synchronization/synthesis and signaling alarm detection in all framing formats. The time slot assignment from the PCM line to the system highway and vice versa is performed without any changes of numbering (TS0 ↔TS0, …, TS31 ↔ TS31).

- Monolithic, single channel, T1/E1/J1 Framer, Line Interface Unit and Signaling Controller for Long Haul & Short Haul applications
- Crystal-less wander and jitter attenuation/compensation to TR62411
- Frame alignment/synthesis for all standard E1/T1/J1 formats
- Includes 3 HDLC/LAPD signaling controllers
- Real software switchable E1/T1/J1 device by integrated switchable termination resistance (E1 75/120 Ω)
- Enables hitless switching of parallel transmit lines
- Supports programmable system data rates: 2048, 4096, 8192 and 16384kbit/s
- Dual voltage (1.8 V/3.3 V) or single voltage (3.3 V) power supply

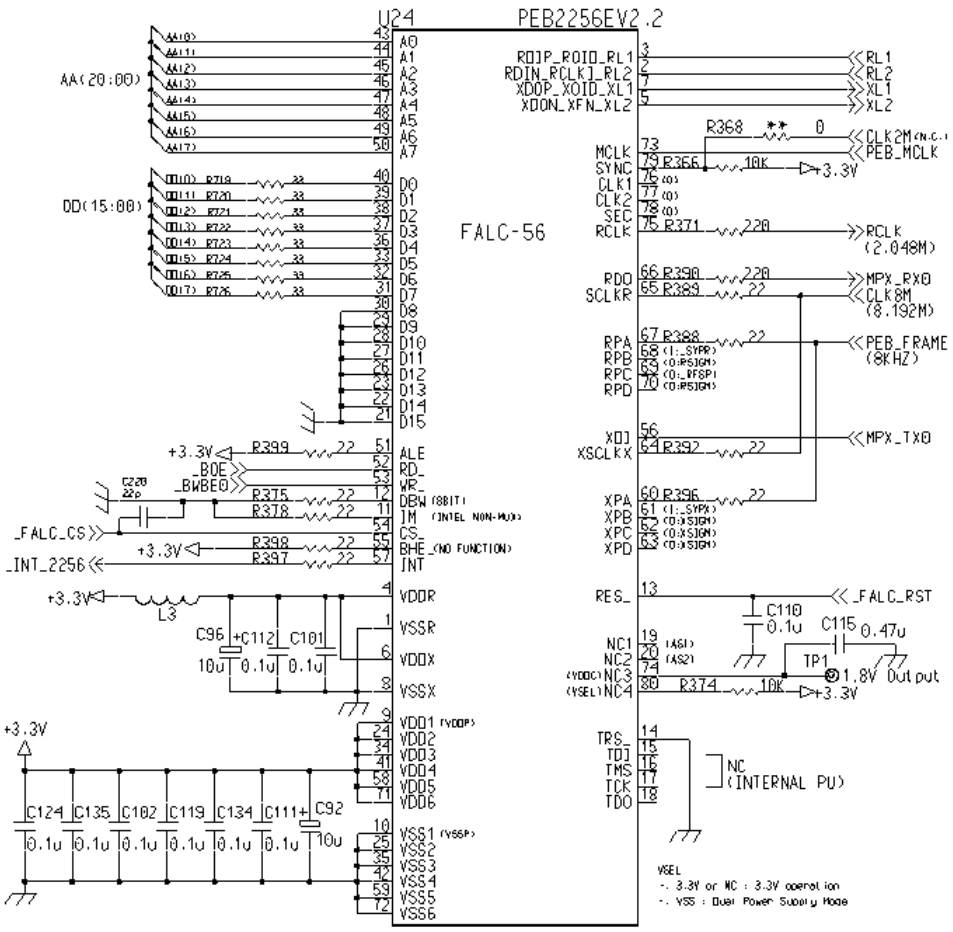


Figure 3.5.10 FALC®56 and its peripheral circuit

a. Master clock

A reference clock of better than ± 32 ppm accuracy in the range of 1.02 to 20 MHz must be provided to master clock signal. The FALC®56 internally derives all necessary clocks from this master.

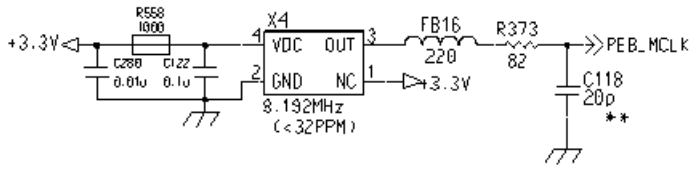


Figure 3.5.11 Master clock generation

The communication between the CPU(ARM7) and the FALC®56 is done using a set of directly accessible registers. The interface is configured as Intel type de-multiplexed data access with a data bus width of 8bits.

b. PCM system interface

The PCM interface with the system highway is implemented by 8KHz signal(PEB_FRAME) and 8MHz data clock(CLK8M) from switch device, ACT-2. PCM frame sync signal(PEB_FRAME) is generated by D Flip-flop to meet required timing for FALC®56 (PEF 2256).

Receive clock(RCLK, Pin#75) with frequency 2.048MHz is extracted from the incoming data pulses to synchronize the system with E1 network. In case of Loss-Of-Signal (LOS), the output is derived from the clock that is provided on MCLK. This extracted clock is routed to PLL device(U11) after being divided by 4 to make 512KHz reference clock for PLL circuit.

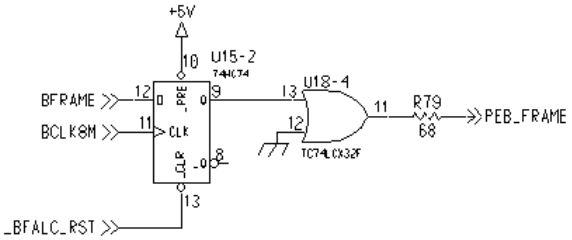


Figure 3.5.12 FALC®56 PCM Frame sync signal

c. Line interfacing circuit

The FALC®56 (PEF 2256) has been optimized to realize generic Long Haul and Short Haul solutions.
The signal at the ternary interface is received at both ends of a transformer. A termination resistor is used to achieve line impedance matching. The E1 operating modes 75 Ω or 120 Ω are selectable by switching an internal termination resistor of 300 Ω in parallel. This selection does not require the change of transformers.
The E1HB8 supports only the line termination of 120 Ω(R99) so the additional impedance match device such as BALUN is needed for connection with operating modes 75 Ω. The serial resistors (R95~98) in transmitter side are recommended with 1:2 transformer to satisfy all related CCITT and ITU-T requirements.
The analog transmitter(T3) transforms the unipolar bit stream to ternary (alternate bipolar) return to zero signals of the appropriate programmable shape. The unipolar data is provided by the digital transmitter.

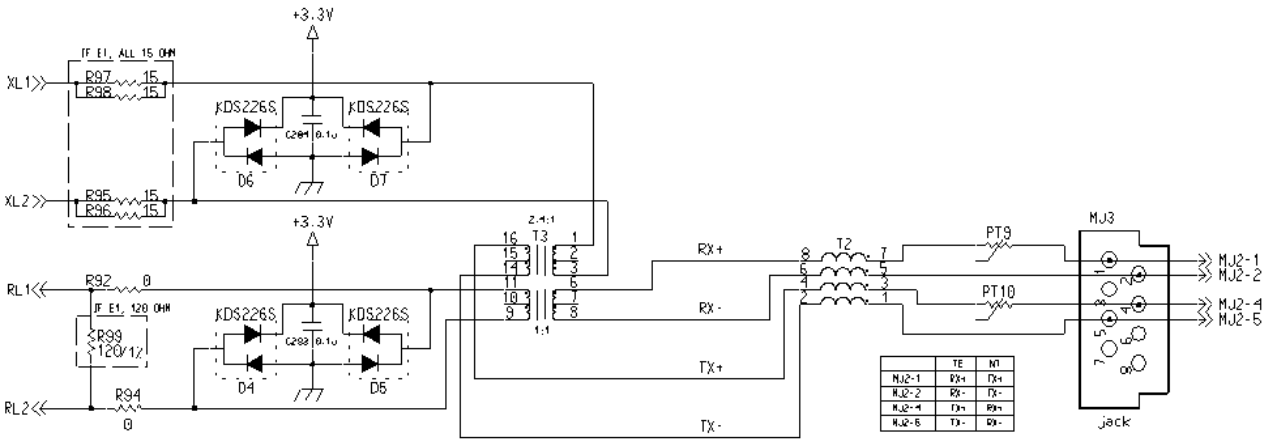


Figure 3.5.13 FALC®56 line interface

Diodes(D4~D7) and poly switches(PT9 and PT10) are to protect FALC®56 (PEF 2256) from high voltage surge, electrical fast transient burst and AC power induction.

G. Phase Locked Loop circuit

The PLL circuit has a role in generating system master clock(32.768MHz) for PCM system in free run mode or synchronous mode. The master clocks(CLK32M and MCLK32M) are provided to switching devices, ACT-2, on the MBU and E1HB8 and they generate various system clock signals.

In free run mode where E1 line is not activated, VCXO(Voltage Controlled Crystal Oscillator,X3) generates 32.768MHz(VCO_OUT) by VC signal fixed to +2.5V with 1% accuracy. On the other hand, VCXO is controlled by comparator output that is generated by exclusive-OR computation with internal feedback clock(Q6 of U16) and extracted reference signal(SIGNAL_IN of U11) from E1 bit streams in synchronous mode.
Analog switch(U1) selects VC control signal to 2.5_VC or COMP_OUT by CPU clock selection signal(CLK_SEL) and Blue LED, LD9, on the E1HB8 turns on when E1 line is activated and PLL circuit operates in synchronous mode.

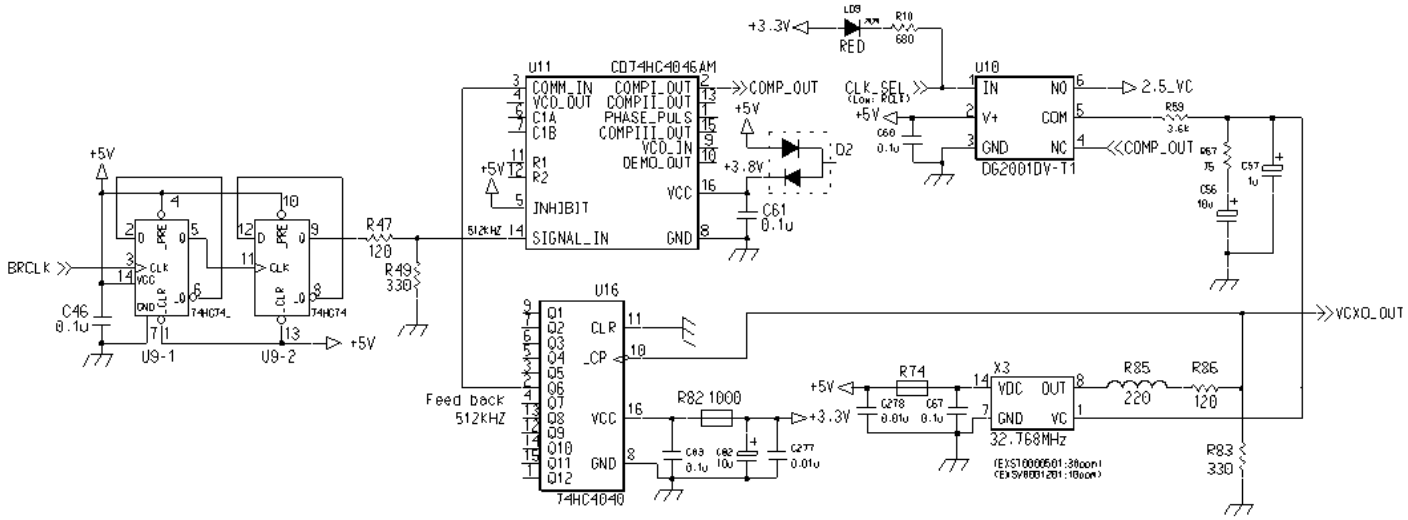


Figure 3.5.14 PLL circuit

BRCLK clock signal(2.048MHz) from FALC®56 (PEF 2256) is divided to 512KHz by D-type Flip/Flop(U9) and routed to PLL IC(U11) for phase comparison with internal feedback clock from counter(U16).
PLL IC(U11) produces comparator output signal that is routed to VCXO through loop filter that is composed of R59, R57, C56 and C57.
The +2.5V DC/DC circuit that consists of U39 and divide resistors generates 2.5_VC bias voltage from +5V power.

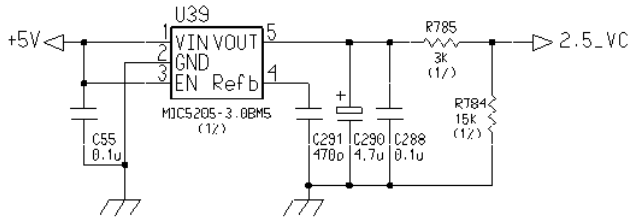


Figure 3.5.15 2.5_VC power circuit

VCXO_OUT(32.768MHz) clock oscillated by VCXO(X3) is routed to switching device, ACT-2, through spread spectrum clock driver(U21) and buffer(U38).

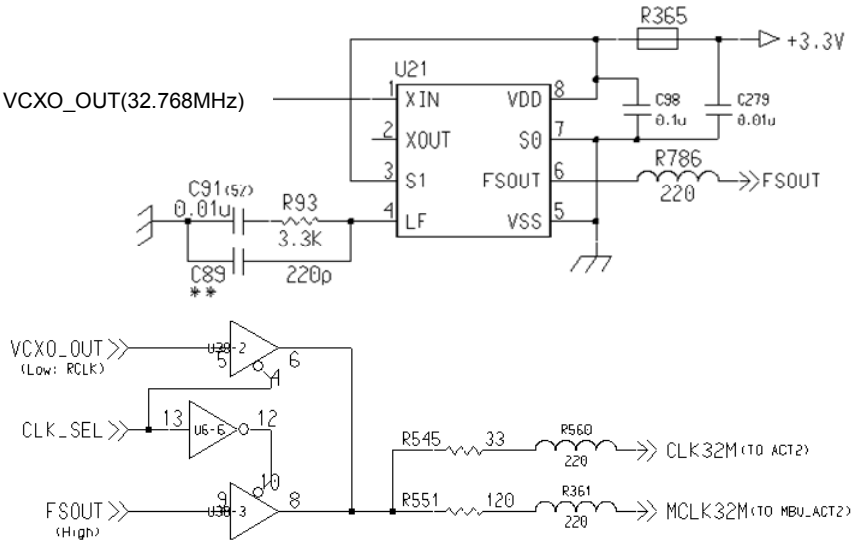


Figure 3.5.16 Clock driver and buffer circuit

H. LAN interface circuit

The S3C4530A has an Ethernet controller which operates at 10-Mbits per second in half-duplex or full-duplex mode.
The Ethernet controller's MAC layer supports media independent interface(MII) that supplies the transmit and receive clocks of 2.5MHz at the 10-Mbit/s speed.
In half-duplex mode, CPU supports IEEE802.3 carrier sense multiple access with collision detection(CSMA/CD) protocol and in full-duplex mode, it supports IEEE 802.3 MAC control layer, including pause operation for flow control.

10/100BaseTX/FX MII Physical Layer Transceiver with Auto cross-over(U8, KS8721) generates +2.5V power with an internal regulator and provides control signal to GREEN LED of MJ1 to indicate Ethernet link state. Line interface circuit incorporates noise filtering (L1, L2) and line protection circuit(D25~D28 and T1) to prevent PHY(U8) from being damaged from high voltage surge and electrical fast transient and burst.

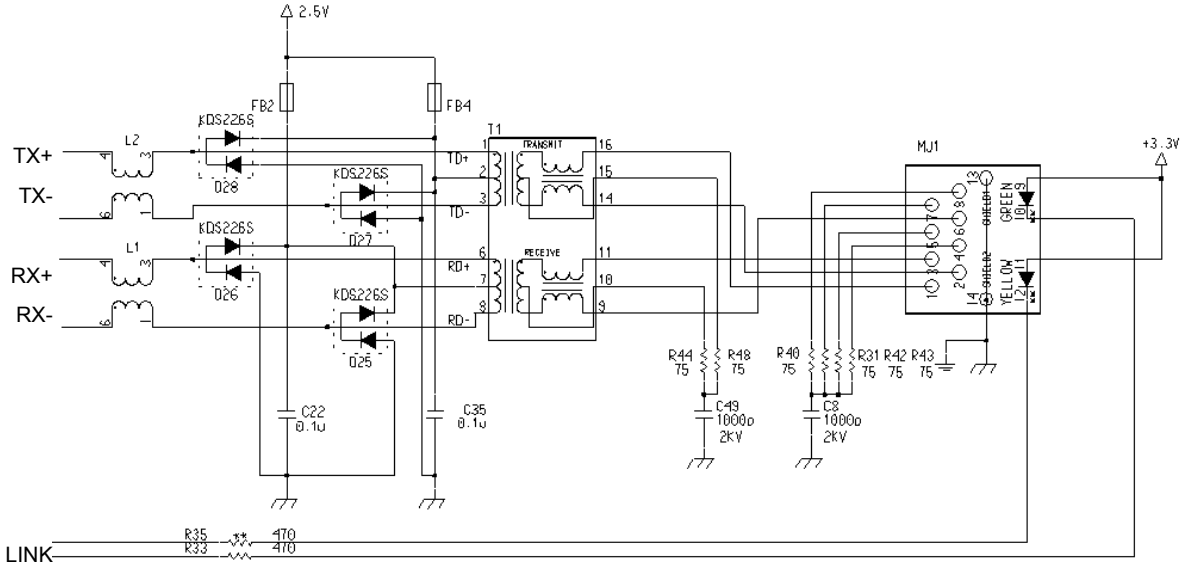


Figure 3.5.17 Ethernet line interface circuit

The filters(L1 and L2) suppress electronic magnetic interference and diodes(D25~D28) protects Ethernet PHY(U8, KSZ8721SL) from high voltage surge, electrical fast transient burst and other electrical disturbances.

I. DSP and its peripheral circuits

The DSP(U35,TMS320VC5402) can perform 30 channels of MFC-R2 generation and decoding at the same time.
DSP decodes MFC-R2 signal from E1 line through FALC56 and ACT-2 to inform CPU of one type out of 15 MFC-R2 tone types by HPI host interface.
For MFC-R2 signaling, time slots 1~15 and 16~31 carry R2 signals that are used to forward or backward information.
R2 signals received from E1 line are input to MPX0 RX port of ACT-2 and switched to MPX1 TX port to make DSP decode tone types of received signals. DSP inform host CPU of decoded information by EVENT format defined between CPU and DSP.
On the contrary, R2 signals generated by DSP with host COMMAND is input to MPX1 RX port and switched to MPX0 TX port through ACT-2. Eventually, MFC-R2 information is transmitted to other side through FALC56.
The HPI(Host Port Interface) is an 8-bits parallel port to interface a host processor with DSP chip. The host can read or write internal DSP RAM fully through a dedicated internal bus.

DSP has an internal PLL circuit that generates internal master clock 100MHz from external clock 10MHz(CLK_10M) and an external clock must be +1.8V voltage signal.

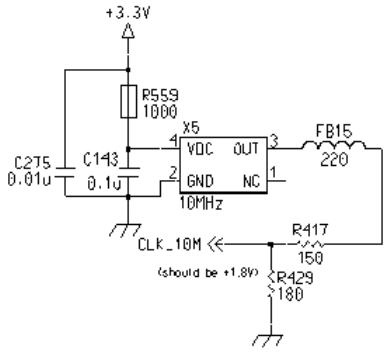


Figure 3.5.18 DSP master clock circuit

Glue logic that is composed of U18 and U20 generates DSP chip selection signal for DSP(U35).
DSP requires read/write signal, R_W, to go to low before chip selection signal, _DSP_CS.
The HPI interface port is composed of chip selection, _DSP_CS, read/write enable signal, _BWBE0, 8bits data bus(HD0~HD7), HPI control register decoding signals, HCNTL0 and HCNTL1, and low/high byte strobe signal, HBIL.

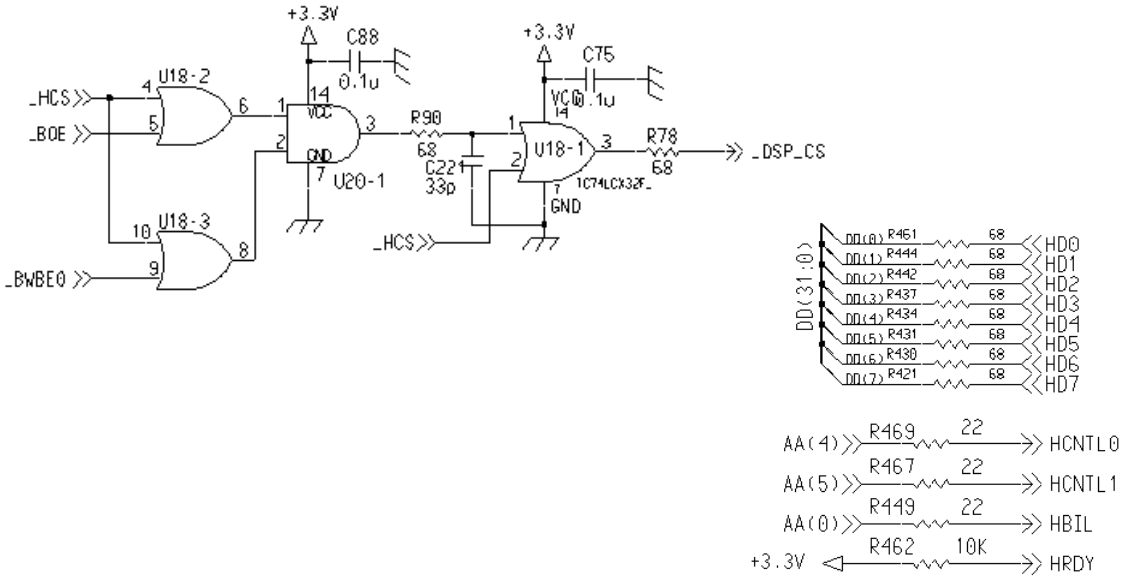


Figure 3.5.19 DSP HPI interface circuit

J. Internal telecom ports

The E1HB8 board provides 8 hybrid ports that can be used to connect DKT or SLT through modular jack, MJ2.
8 DKT interface circuits are placed in the E1HB8 and SLT interface board,SLU8, that has 8 SLT interface circuits is basically installed on connectors(CN6 and CN7) of E1HB8.
The main CPU on the MBU controls all functions needed to support 8 hybrid ports and the decoder IC(U22) is used to select one of 4 I/O buffers.

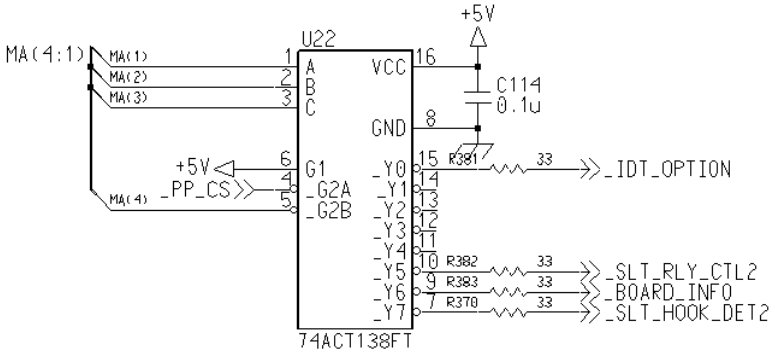


Figure 3.5.20 SLU8 decoding circuit

The CPU downloads DSP coefficients to PCM CODECs in the SLU8 board and read registers from them with data latch buffer(U37). A Blue LED(LD10) on Pin#14 of U37 will turn on whenever any terminal on the E1HB8 is in activated state. Output latch buffer(U32) that is accessed by chip selection signal, _SLT_RLY_CTL2, is to control ring relays and input

data buffer(U36) that is controlled by _SLT_HOOK_DET2 is used for main CPU to sense SLT hook state.
The main CPU on the MBU can detect whether SLU8 board is installed or not and get board information from input data buffer(U31) that is accessed by _BOARD_INFO.

a. SLT - Analog terminal part

The SLU8 board is commonly used in E1HB8 and CSB316.
Please refer to them in CSB316 section for detail circuit descriptions of SLT interface circuits.

b. DKT- Digital Terminal part

The digital line interface circuit is composed of the GSL12 block of ACT-2, a matching transformer, capacitors, resistors and a posistor. It provides a connection with two wires to one digital terminal. Capacitors(C197 and C213) and diodes(D22 and D23) are used for protecting line interface circuit against ESD or lightning surge.

It provides +30V power to the digital terminal through the transformer(T11) and the posistor(PT8) is used to protect the over current due to line short. The DKT TX interface line of the GSL12 block of ACT-2 on the MBU are output terminals and used to transmit a digitized voice and data to the digital terminals via the transformer. And the DKT RX lines of the GSL12 block of ACT-2 are input terminals and are used to receive a digitized voice and data from the digital terminals.
There is only line interface circuit in the E1HB8 and AMI signals(DKT9~DKT16) come from GSL12 block of ACT-2 on the MBU.
The below circuit shows the first port of DKT interface circuits in the E1HB8 and the rest ports are same to it.

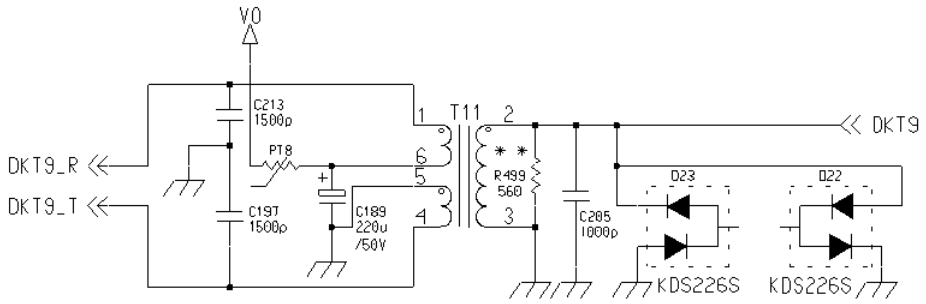


Figure 3.5.21 Digital line interface circuit

3.5.4 Connectors, Modular jacks and LEDs

There are various kinds of connectors, switches, modular jacks and LEDs in the E1HB8. The below figure shows the layout of E1HB8 and the location of connectors, switches, modular jacks and LEDs.

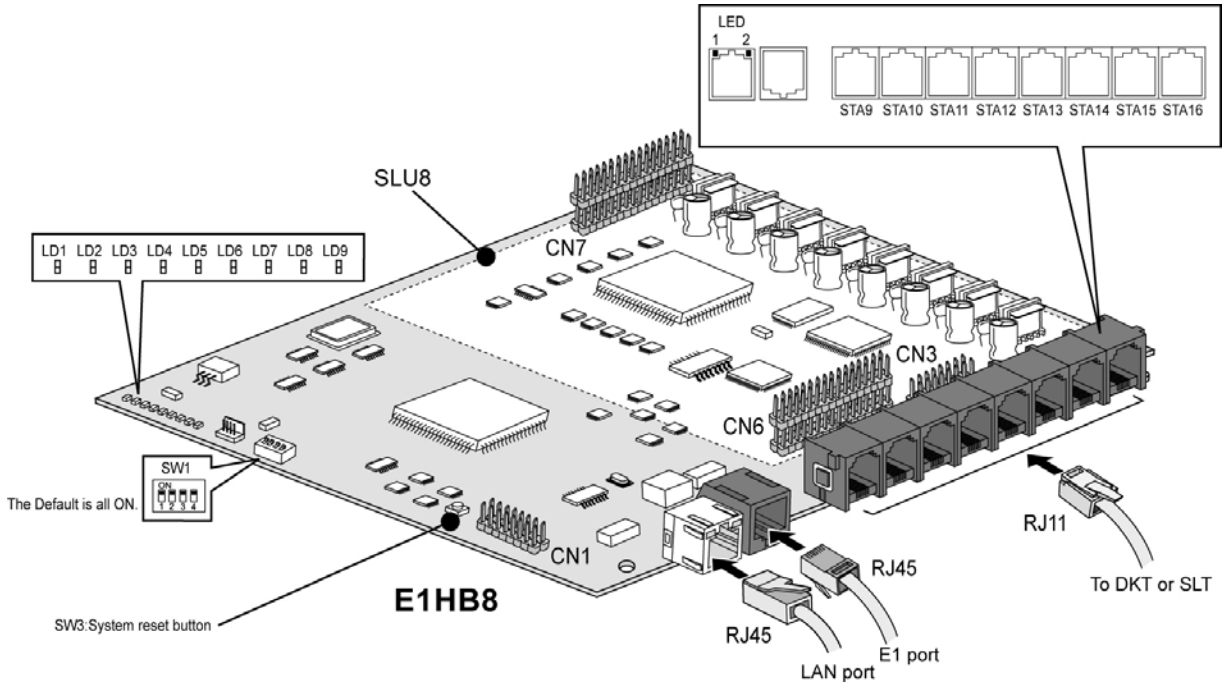


Figure 3.5.22 the layout of E1HB8

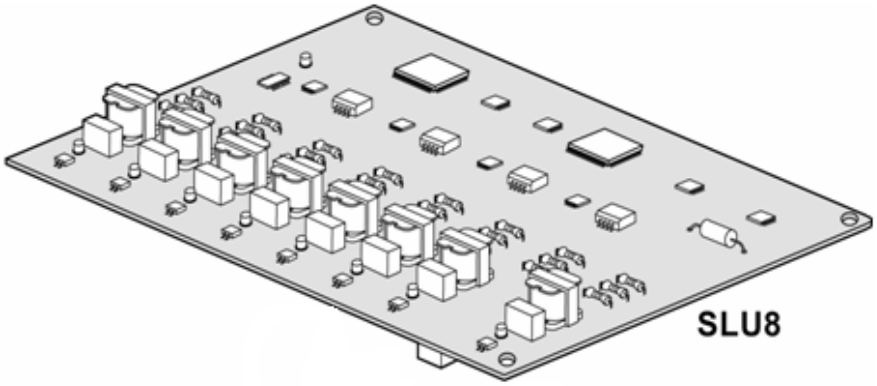


Figure 3.5.23 the layout of SLU8

Pin assignments of CN5, CN6 and CN7

	Pin	Pin name	Description	Pin	Pin Name	Description
CN5	A1	MCLK32M	32MHz clock for ACT2	B1	VO	V0(+30V) power
	A2	GND	Ground	B2	+5V	+5V power
	A3	-5V	-5V power	B3	GND	Ground
	A4	GND	Ground	B4	OPEN	-
	A5	MA(1)	Address(1) from MBU	B5	GND	Ground
	A6	MA(2)	Address(2	B6	M_MPX_RX	MPX PCM bus RX
	A7	MA(3)	Address(3)	B7	M_MPX_TX	MPX PCM bus TX
	A8	MA(4)	Address(4)	B8	_M_WE0	_WE signal
	A9	OPEN	-	B9	_M_OE	_OE signal
	A10	EXP_FRAME	Frame from master ACT	B10	_PP_RESET	PP reset signal
	A11	RX_ISC2	RX highway2	B11	+3.3V	+3.3V power
	A12	TX_ISC2	TX_highway2	B12	_PP_CS	PP chip selection
	A13	MD(0)	Data(0) from MBU	B13	M_CLK2M	2MHz clock
	A14	MD(1)	Data(1)	B14	M_FRAME	Frame signal
	A15	MD(2)	Data(2)	B15	DKT9	DKT data signal
	A16~A20	MD(3)~MD(7)	Data Bus(3~7)	B16~B20	DKT10~DKT14	DKT data signal
	A21	OPEN	-	B21	DKT15	DKT data signal
	A22	DOUT	Data out from SICOFI	B22	DKT16	DKT data signal
	A23	GND	Ground	B23	GND	Ground
	A24	RING	Ring(25Hz,75Vrms)	B24	OPEN	-
	A25	GND	Ground	B25	OPEN	-

Table 3.5.5 Pin assignment of CN5

※*NOTE*

(a) MCLK32M: 32.768MHz master clock for master ACT-2.

(b) EXP_FRAME is used to synchronize slave ACT-2 in the E1HB8 with master ACT-2 in the MBU.

(c) System back-plane bus(called Inter-System Connection, ISC) is composed of several highway signals(TX_ISC# and RX_ISC#), reference clock(CLK8M), and synchronization signal(EXP_FRAME) and each highway signal incorporates HDLC channel and 48 B-channels for voice switching. TX_ISC2 stands for TX highway signal 2, RX_ISC2 for RX highway 2 and so on.

(d) MA and MD: address and data bus from/to main CPU in the MBU to control 8 SLT interface board, SLU8.

(e) _M_WE0, _M_OE and _PP_CS: control signals for MBU CPU to read/write I/O buffers to control SLU8.

(f) DOUT: Data out from PCM CODEC in the SLU8. MBU CPU reads or write the data with DIN, DOUT, DCLK and _CS. DIN, DCLK and _CS signals are made from output latch buffer(U37)

(g) M_MPX_RX/TX: PCM highway from/to MBU ACT-2 that carries multi-channels of voice data for PCM CODEC.

(h) PCM highway called MPX bus operates with frame signal, M_FRAME, and data clock,M_CLK2M.

(i) DKT# is digital terminal interfacing signals from MBU ACT-2 for 8 hybrid ports.

CN	PIN	Pin name	Description	PIN	Pin Name	Description
CN6	A1~A8	SLT9_R ~ SLT16_R	SLT interface, Ring	B1~B8	SLT9_R ~ SLT16_R	SLT interface, Tip
	A9	-	Open	B9	-	Open
	A10	SLU8_CODEC_DET	CODEC detection	B10	GND	Ground
	A11	V0	+30V power	B11	V0	+30V power
	A12	GND	Ground	B12	GND	Ground
	A13	GND	Ground	B13	RING	25Hz SLT ring

Table 3.5.6 Pin assignment of CN6

CN	PIN	Pin name	Description	PIN	Pin Name	Description
CN7	A1	-5V	-5V Power	B1	+5V	+5V Power
	A2~A9	_SLT_HOOK9 ~ _SLT_HOOK16	SLT Hook sense	B2~B9	RING_RLY9 ~ RING_RLY16	Ring relay control
	A10	2MCLK	2 MHz Clock	B10	DIN	Data In
	A11	FRAMESYNC	Framesync for SLU8	B11	DCLK	Data Clock
	A12	_IDT_SL3	IDT CS for U2 on SLU8	B12	DOUT	Data out
	A13	_IDT_SL4	IDT CS for U3 on SLU8	B13	_PP_RESET	PP Reset for SLU8
	A14	MPXB_TX	PCM bus TX	B14	MPX_RX	Multiplexed bus RX
	A15	8SLU_DET	SLU8 Detection	B15	GND	Ground

Table 3.5.7 Pin assignment of CN7

B. LED indications

The 10 LEDs mounted in the E1HB8 provide diagnostic information for states of the board.

LED	Function	Status		Remark
		ON	OFF	
LD1(Yellow)	PLL Synchronization	Sync. Error	Normal	
LD2(Yellow)	Loss of Signal from the Line	LOS	Normal	
LD3(Yellow)	AIS	Alarm error	Normal	
LD4(Yellow)	Frame Alignment Error	FA error	Normal	
LD5(Yellow)	Multi-use	MF error	Normal	
LD6(Yellow)	Board Sync Error	Error	Normal	
LD7(Yellow)	Indication of channel use	Channel use	All channel Idle	
LD8(Yellow)	Normal operation indication	Blink		
LD9(Red)	PLL clock selection	External	Internal	
LD10(Blue)	In-use indication of 8 Hybrid	In-use	Idle	

Table 3.5.8 LED indications

* Note

(a) In normal operation of slave clock, LED 8 is blinking and LED 9 is turned ON.

(b) In normal operation of master clock, LED 8 is blinking and LED 7 is turned ON.

(c) If the E1 line has no signal, LED 2, 4, 5 and 7 are turned ON.

(d) If at least one of LED 2, 3, 4 and 5 is turned ON, it says the E1 line has faults physically. so, it needs to contact PXs engineer to check E1 line.

(e) Reference clock extracted from E1 bit streams is selected and LD9 red LED turns on only when E1 line is activated and there isn't any error.

(f) LD10 blue LED turns on whenever any internal terminal(DKT or SLT) is in activated state.

It is possible to check the state of Ethernet port visually by LEDs on RJ45 modular jack(MJ1).

MJ1-LED	Meaning	
LED1 (Green)	OFF: No Link	ON: Link, Toggle: Data Transfer
LED2 (Orange)	OFF: Link and activity at 10Mbps	ON: Link and activity at 100Mbps

Table 3.5.9 MJ1 LED Indications

C. Modular jack pin assignment

LAN PORT: MJ1

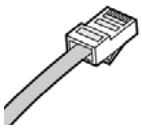
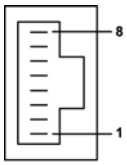
Connector	Pin Number	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	RESERVED	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

Table 3.5.10 Pin assignment of MJ1

E1 PORT: MJ3

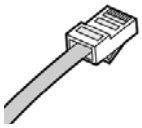
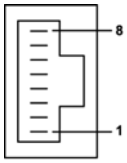
Connector	Pin Number	NO	SIGNAL NAME
RJ45 		1	RX-Tip
		2	RX-Ring
		4	TX-Tip
		5	TX-Ring
		3	N/A
		6	N/A
		7, 8	N/A

Table 3.5.11 Pin assignment of MJ3

RJ11 PORT

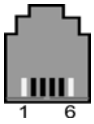
Connector	PIN Number	NO	SIGNAL NAME
RJ11 		1	N/A
		2	DKT-T
		3	SLT-T
		4	SLT-R
		5	DKT-R
		6	N/A

Table 3.5.12 Pin assignment of MJ2

3.6 VMIU/AAFU

(Voice Mail Interface Unit/Auto Attendant Function Unit)

3.6.1 General

The VMIU Provides the announcements for the system's UCD feature as well as the system voice prompt and personal user greetings. System voice prompts; UCD and user greeting will be stored in Flash memory. Voice data are compressed or decompressed by the processing of DSP during recording and playing.
There are four (4) recording/playing channels. Note that each channel can operate as either recording or playing mode at a time.
The DSP (TMS320VC5402PGE) provides 32Kbps at an 8KHz sampling rate when activated without gap coding.
This board can be installed VMIU/AAFU slot on MBU.

3.6.2 VMIU/AAFU Block Diagram

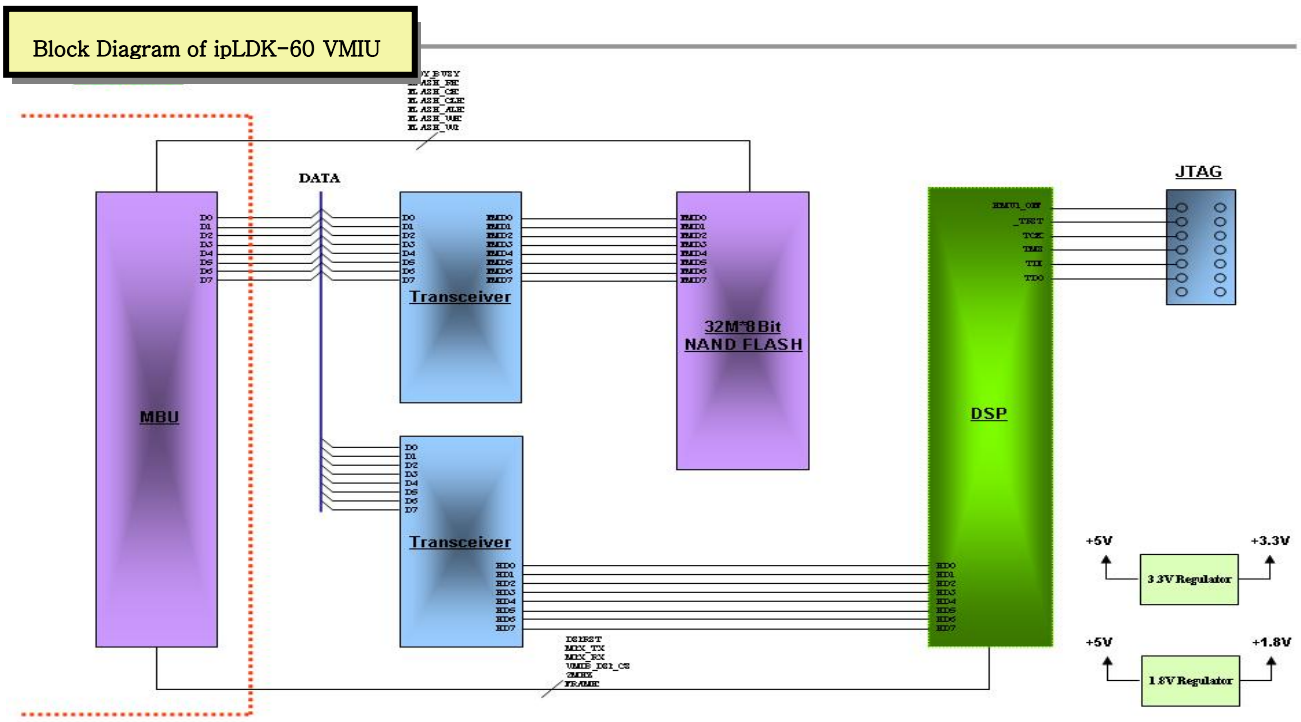


Figure 3.6.1 Block Diagram of VMIU/AAFU

3.6.3 Functional description

The DSP (TMS320VC5402PGE) chip is a digital speech/signal processing subsystem that implements speech compression and voice prompt, telephone line signal processing and flash memory management.
The DSP message storage utilizes a proprietary, high quality speech compression algorithm to reduce the data rate of the speech signal. The compression algorithm is high rate, without 'gap coding' and 32kbps at 8KHz sampling rate.

A. Digital Voice activated recording (VOX)

Digital Voice Activity detection is implemented in the DSP and can be activated only in record mode. According to the host command recording of the speech signal may either start upon a positive result of voice activity detection or immediately after issuing a recording command.

B. Message play back

The DSP supports random access for playback of any recorded message. During playback, the DSP monitors the telephone line.

C Call progress tone (CPT) Detection

The DSP monitors the line for incoming telephone line signals and detects the presence of call progress tones in a predefined frequency region. The DSP supports call progress tone detection by utilizing a filter/detector with a bandwidth of 300-640 Hz. Indication of the presence of call progress tones is transferred to the main CPU, it be used for terminating recording.

D. Power Specification

The DSP and Flash memory chips require +3.3V (+/-5%) but +5V (+/-5%) is need for other chips.

3.6.4 Circuit description

A. DSP and its peripheral circuits

The DSP CODEC (TMS320VC5402PGE) is a versatile, multi-functional Analog Front-End IC, featuring the combination of Sigma-Delta CODECs, DSP, Analog muxes and amplifiers with programmable gain, having various peripheral interfaces on a single chip.
All DSP (U1) in VMIU/AAFU works with main clock 10MHz from oscillator, X1, and has host port interface block that is composed of data bus(HD0~HD7), HCNTL1/2, HBIL, HR/W, HDS1/2, HCS, HAS, HRDY and HINT signals for command & event communication with host CPU on the MBU.

B. Decoding circuit

The CPU of MBU in IPLDK-60 system generates various chip selection signals with _VMIU_DSP_CS signal, _FLASH_CS and data, 2MHz clock and the information of Flash for operation of VMIU. Below table shows the descriptions of chip selection signals used in VMIU.
Level buffering is needed because flash memory works with +3.3V and +1.8V power so that buffer (U3), OR-gate IC (U5) and AND-gate IC (U9) are used to generate signals for controlling flash memory and other signals.

Chip selection	Bus Width	Description
_VMIU_DSP_CS	8bits	Read/write DSPs on VMIU
_FLASH_CS	8bits	Read/write voice data from/to flash memory

Table 3.6.1 Decoding signals

C. LEVEL Buffering circuit

The DSP, Flash memory and some buffers require +3.3V (+/-5%) so that power regulator (U8) provides it and bi-direction buffer (U3) converts +5V data bus to +3.3V bus and vice versa.

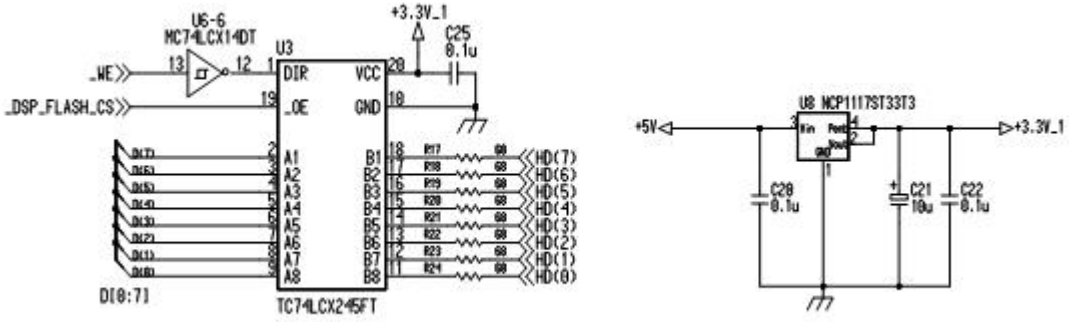


Figure 3.6.2 Level buffering circuit

D. Flash memory

NAND Flash memory (U2, 256MX1ea) stores voice data compressed with 32Kbps by DSP and provides about 136 minutes of recording time.

3.6.5 Connector

VMIU/AAFU has a connector for interfacing with MBU. Pin assignments of connector (CN1) is the same with other side of MBU except that A5 and A16 pin is tied to ground for VMIU board detection.

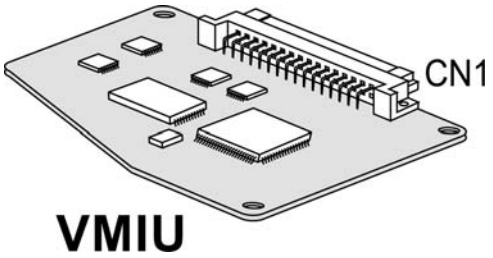


Figure 3.6.3 VMIU/AAFU Layout

Connector

CNNT	Pin Number	Pin name	Description	Pin Number	Pin name	Description
CN1	A1,B1	+5V	+5V power	B2	_WE0	Write Enable
	A5,A16	GND	Ground	B3	_OE	Out Enable
	A2	_FLASH_CS	Flash Chip Select	B4	MPX_RX_VMIU	PCM bus RX for VMIU
	A3	_DSPRST	DSP Reset	B5	_INT_VMIU	Interrupt for VMIU
	A4	MPX_TX	PCM bus TX	B6	_VMIU_DSP_CS	VMIU DSP Chip Select
	A6~A13	VD(1)~VD(8)	Data for VMIU	B7	2MHz_VMIU	2 MHz for VMIU
	A14	A(9)	Address	B8	VMIU_FS	VMIU Framesync
	A15	A(11)	Address	B9	RDY_BUSY	Ready Busy
	B14	A(10)	Address	B10	FLASH_WP-	Flash Memory Write Protect
	B15	_VMIU_DET	VMIU Detection	B11	FLASH_CE-	Flash Memory Enable Master Switch
	B16	_AAFU_DET	AAFU Detection	B12	FLASH_CLE	Flash Memory Command Latch Enable
				B13	FLASH_ALE	Flash Memory Address Latch Enable

Table 3.6.2 Pin assignment of CN1

3.7 MODU (Modem Unit)

3.7.1 General

The MODU (MODEM Unit) provides serial communication for remote maintenance and PC Admin. It supports V.34, V.32bis, V.32, V.22bis, V.22, V.23, and V.21 Data Mode. Therefore it operates in full-duplex, asynchronous modes at line rates up to 33kbps.

3.7.2 Block Diagram & Description

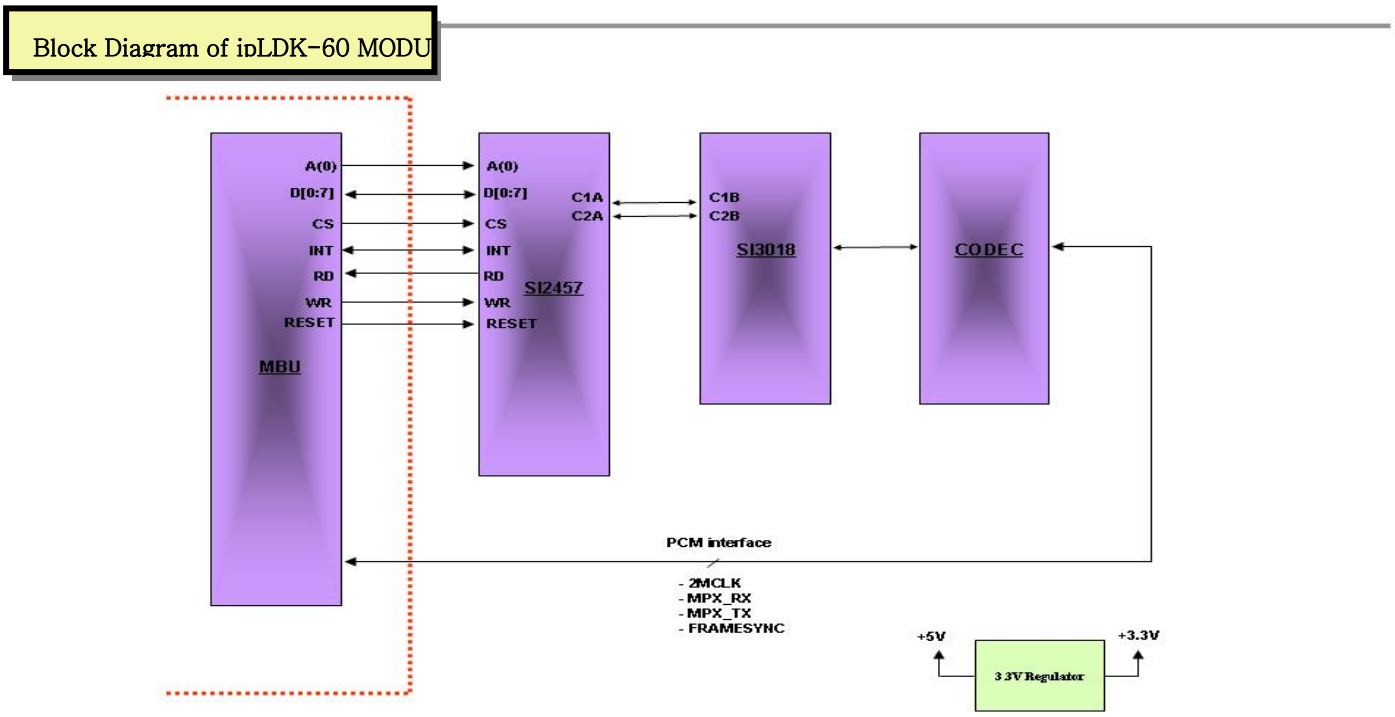


Figure 3.7.1 Block Diagram of MODU

MODU consists of MODEM chip (Si2457), line-side direct access arrangement (DAA) chip (Si3018), CODEC, DC/DC power generation circuit and so on.
MODEM chip (U1) is a complete embedded modem chipset with integrated direct access arrangement (DAA) that provides a programmable line interface to meet global telephone line requirements. It includes a DSP data pump, a modem controller, on-chip RAM and ROM, an analog front end (AFE), a DAA, and an analog output. Line-side DAA chip (U2) connects directly with the telephone local loop (TIP and RING).
Data interface with CPU can be configured as either a serial UART interface with flow control or as a parallel 8-bit interface. The UART port1 of CPU is used for serial interface with MODU.

Modulated analog signal from PSTN through CO interface circuit is converted to PCM data by CODEC before it is switched to MODU. The CODEC (U3) on the MODU extracts PCM modem data from a time slot of PCM highway, MPXB_TX, with a specific frame sync signal (FRAMSYNC) and converts it to analog signal.
This expanded modulated analog signal is sent to MODEM chip through line-side DAA chip (U2) and telephone line

circuit for de-modulation. The signal flow from MODU to PSTN works with the polar opposite way.
Regulator, U4, generates +3.3V power for MODEM chip.
MODU has a connector for interfacing with MBU. Pin assignments of connector (CN1) are the same with other side of MBU.

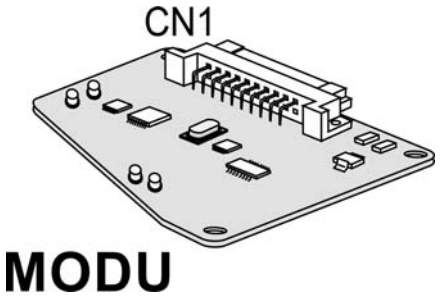


Figure 3.7.2 MODU Layout

3.8 CMU50PR / CMU12PR

(Call Metering-50Hz and Polarity Reversal Detection Unit) / (Call Metering-12/16kHz and Polarity Reversal Detection Unit)

3.8.1 CMU50PR (Call Metering-50Hz and Polarity Reversal Detection Unit)

The Call Metering-50Hz and Polarity Reversal Detection Unit (CMU50PR) provides 3 Call Metering Detection circuits for 50Hz and provides 3 channels of Polarity Reversal Detection for Call Metering or signaling. It can be installed on MBU, EMBU, CHB308 and CSB316.

3.8.2 CMU12PR (Call Metering-12KHz and Polarity Reversal Detection Unit)

The Call Metering-12KHz (or 16KHz) and Polarity Reversal Detection Unit (CMU12PR) provides 3 Call Metering Detection circuits for 12KHz (or 16KHz) and provides 3 channels of Polarity Reversal Detection for Call Metering or signaling. It can be installed on MBU, EMBU, CHB308 and CSB316.

3.8.3 Block diagram

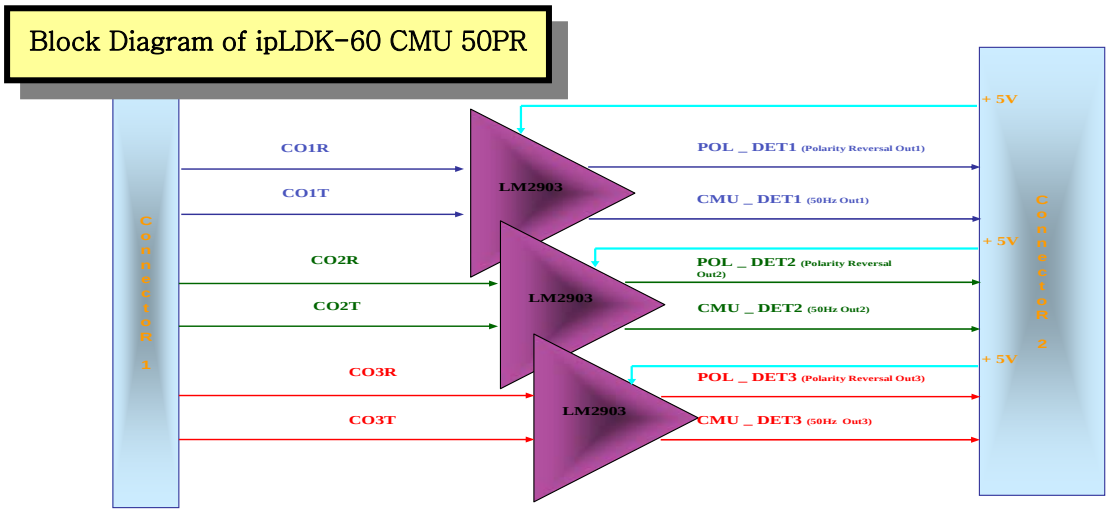


Figure 3.8.1 Block diagram of CMU50PR

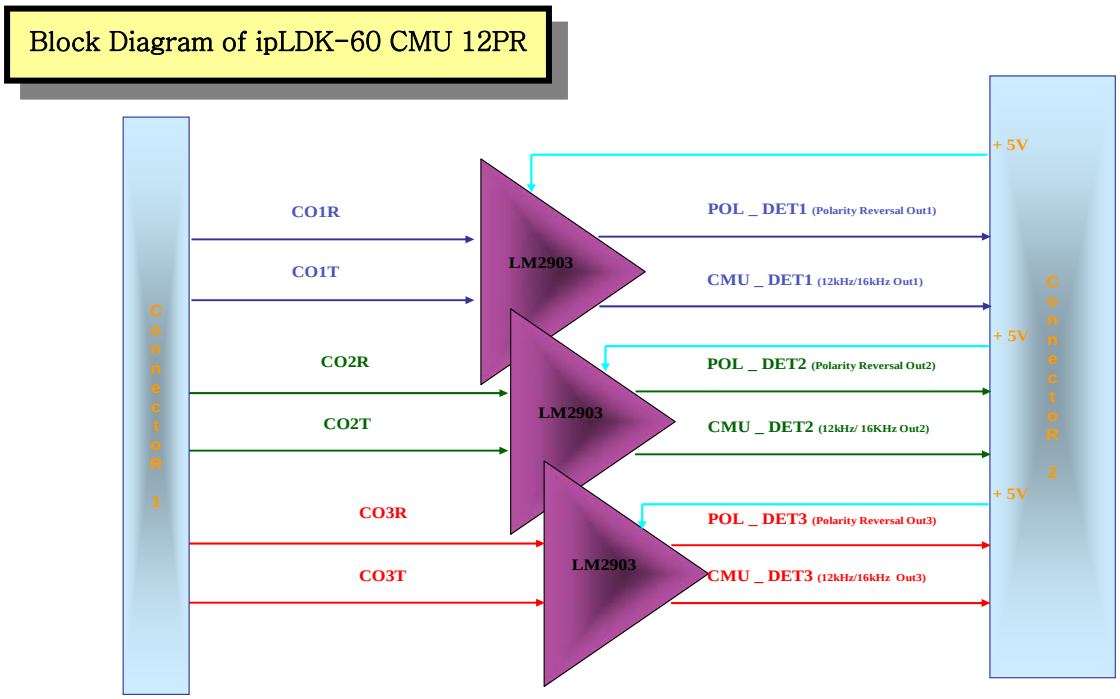


Figure 3.8.2 Block diagram of CMU12PR

3.8.4 Circuit description

A. Polarity Reversal part

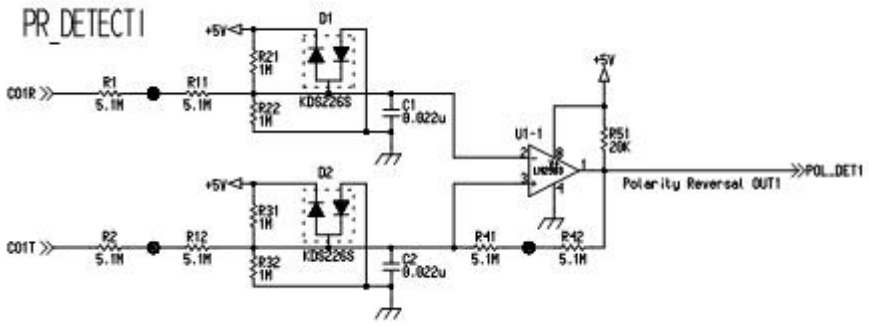


Figure 3.8.3 PR detection circuit

This section describes 1st port (related 1st CO) as an example. Tip and Ring signal of CO pass through high impedance resister (R1, R2, R11, R12). And then, come to U1 for comparison between Tip polarity and Ring polarity. So, if polarity is changed, 'POL_DET1' signal (refer to above picture) will be changed different value (low become high, high become low). And then, the CPU on MBU indicates changed polarity.

B. Call Metering-50 Hz detection part

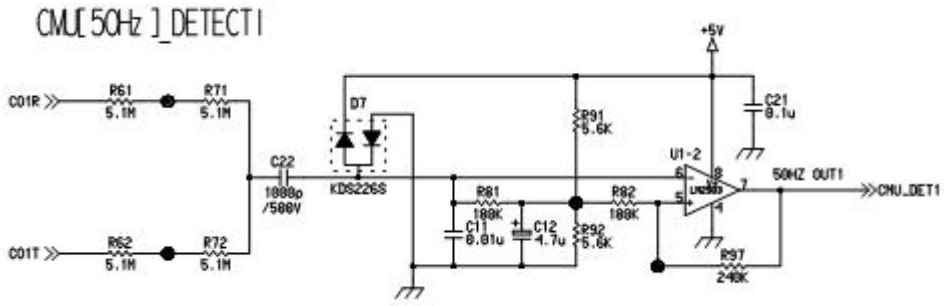


Figure 3.8.4 Call Metering-50Hz detection circuit

This section describes 1st port (related 1st CO) as an example. Tip and Ring signal of CO pass through high impedance resister (R1, R2, R11, R12). And then, come to U1 for comparison between Tip polarity and Ring polarity. So, if polarity is changed, 'CMU_DET1' signal (refer to above picture) will be changed different value (low become high, high become low: Default value of Call Metering-50Hz is high. It means that OFF state of Call Metering-50Hz is high.) And then, the CPU on MBU indicates the Call Metering-50Hz signal.

C. Call Metering-12kHz or 16kHz detection part

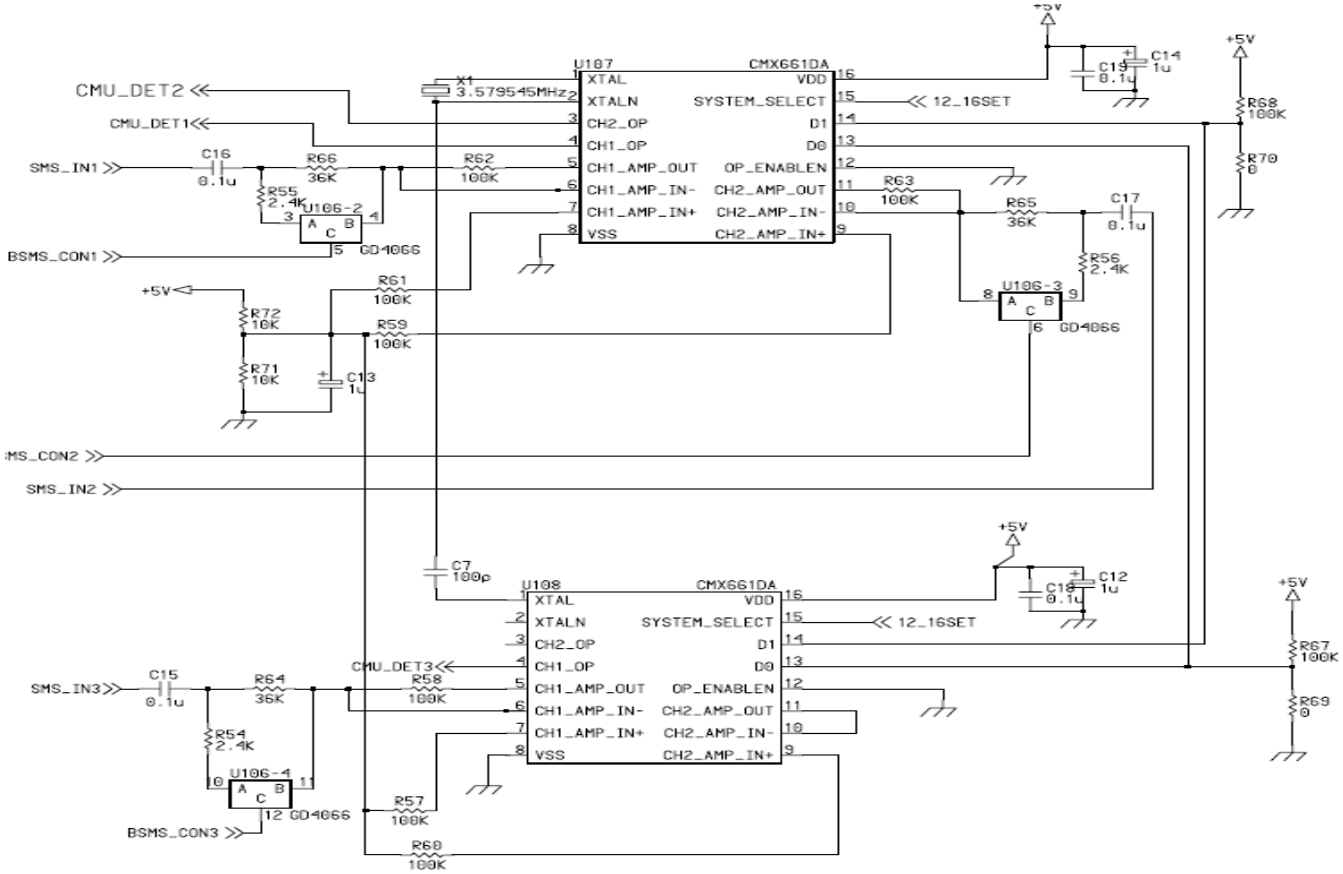


Figure 3.8.5 Call Metering-12KHz or 16kHz detection circuit

This section describes 1st port (related 1st CO) as an example. Tip and Ring signal of CO pass through high impedance resister (R1, R2, R11, R12). ‘CMU_DET1’ signal (refer to above picture) will be changed low value(Default value of Call Metering-12kHz or 16kHz is high. It means that OFF state of Call Metering-12kHz or 16kHz is high.) And then, the CPU on MBU indicates the Call Metering-12kHz or 16kHz signal.

3.9 Voice over Internet Protocol Interface Module(VOIB)

3.9.1 General

The VOIB provides an Ethernet interface to connect the system to a network that supports Internet Protocol (IP) and is installed on basic KSU. The board transmits and receives voice and data in an IP format to and from the system. This board supports Voice over IP (VoIP) and Fax over IP (FoIP).

The purpose of the board is to take advantage of the applications offered utilizing IP protocol while retaining the reliability of traditional telephone PBX and it requires a unique address, known as an IP or TCP/IP address.

This address must be compliant with IANA (Internet Assigned Number Authority) standards for IP addressing to insure its individuality.

Until the IP address is entered in programming, the VOIB is inactive.

The board allows VoIP and works with both the Internet and Intranet.

The board adheres to the standards set forth in H.323 Revision 3.

To insure Quality of Service (QoS), it is recommended that this application use a LAN or WAN.

This board design reduces echo, jitter, and latency by utilizing the H.323 Rev. 3 fast protocol.

The QoS is equal to or better than “Toll Quality” achieved by automatic online adjustments to customize each call.

The VOIB provides basic four VOIP channels and has a option board VOIU that provides additional four VOIP channels.

3.9.2 Block Diagram

Block Diagram of ipLDK-60 VOIB

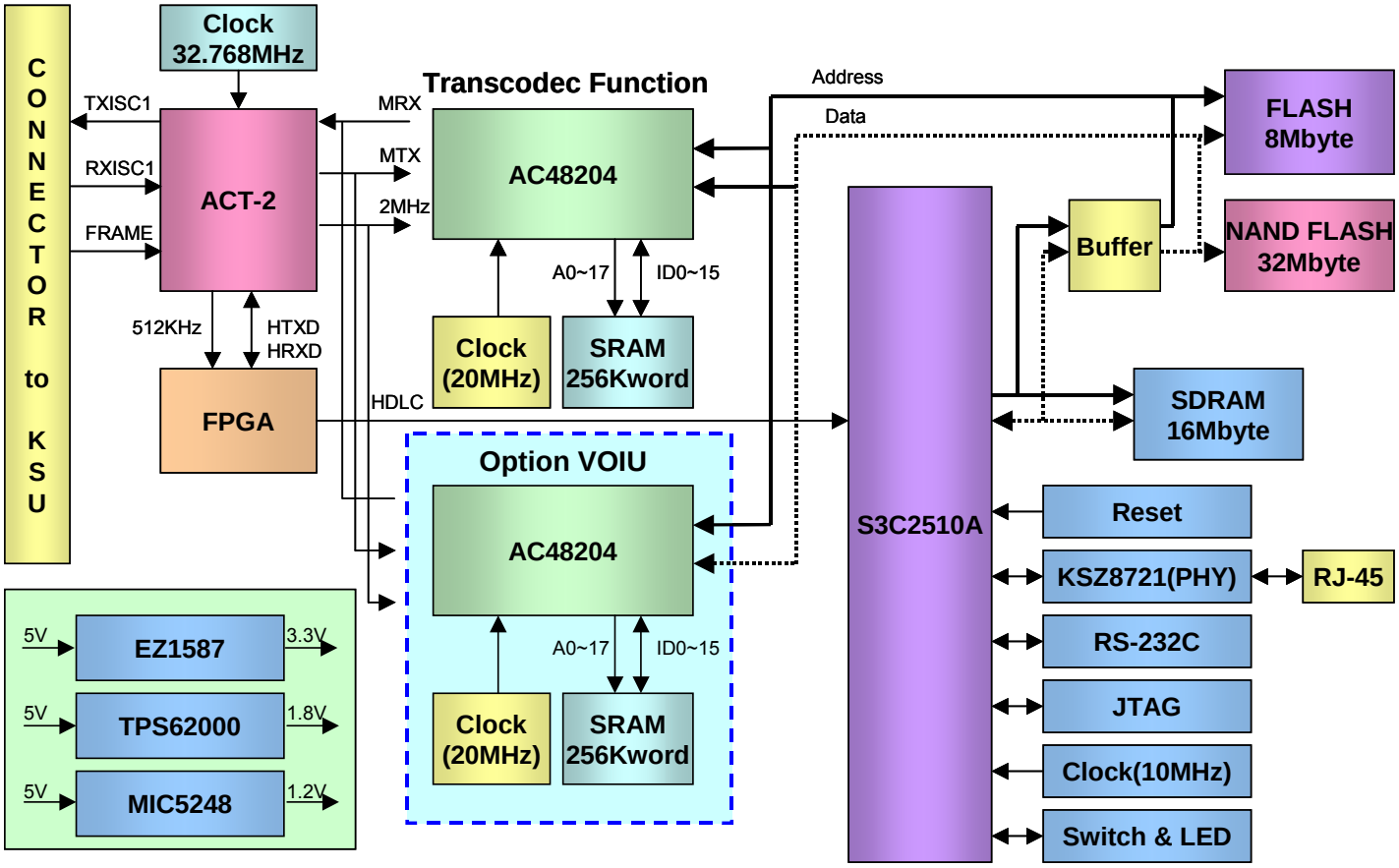


Figure 3.9.1 Block diagram of VOIB

3.9.3 Circuit Description

A. CPU and Memory

S3C2510A 16/32-bit RISC micro-controller is a cost-effective, high-performance micro-controller solution for Ethernet-based systems, for example, SOHO router, internet gateway, WLAN AP, etc.
A variety of communication features are embedded into S3C2510A required in many communication areas including two Ethernet MACs, three TSAs supporting IOM2, two high speed UARTs, a console UART, and USB.
A security feature is also supported by DES/3DES accelerator.

Fast devices with 70ns access time are required for 2-wait system, which is not feasible for less cost system.
VOIB will require two wait state for program memory (Flash memory) and data memory.
S3C2510A has a lot of programmable internal I/O registers, which gives great flexible features, however, requires attention for software to program internal registers correctly.

Type	Device Size	Access Time	EA	Size
Flash memory	2M x 16bits	70ns	1	4M Bytes
SDRAM	4M x 32bits	60ns	1	16M Bytes
NAND flash memory	32M x 8bits	70ns	1	32M Bytes

Table 3.9.1 Memory size

Memory controller consists of Ext I/O Bank controller and SDRAM controller. Ext I/O Bank controller supports ROM, SRAM and Flash memory. SDRAM controller support SDRAM.
Each bank is set by corresponding registers and the below table shows system memory assignments for VOIB.

Chip selection	Bus Width	Description
_SDCS0	32bits	SDRAM(U2)
_RCS0	16bits	NOR flash memory(U3)
_RCS1	16bits	Reserved
_RCS2	16bits	Reserved
_RCS3	8bits	NAND flash memory(U18)
_RCS4	8bits	DSP0(U6) on VOIB
_RCS5	8bits	DSP1(U2) on VOIU
_RCS6	16bits	ACT-II(U7)
_RCS7	8bits	FPGA(U54)

Table 3.9.2 Chip selection signal

Address and data bus are buffered by 16bits driver 74LVC16244(U5 and U6) and 16bits bi-directional driver 74LVC16245(U8) to increase fan-out capacity.

UART0 is for RS232C serial communication to trace the state of CPU operation in development stage and supports 9600bps to 110520bps. A HDLC controller is implemented in FPGA with VHDL coding to communicate between main CPU on the MBU and local micro-controller through HDLC port of ACT-II. Programmable I/O ports are used for flash memory control, board detect, watch dog, DSP reset, interrupt source and so on.
The two Ethernet controllers support both the media independent interface (MII) and the buffered DMA interface (BDI).
The MAC layer consists of a receiver and a transmitter blocks, a flow control block, a content addressable memory(CAM) for storing network addresses, a number of commands, status, and error counter registers.
The MII supplies the transmission and reception clocks of 25MHz for 100M-bps operation, 2.5 MHz for the 10Mbps speed or 1MHz for (the 1M-bps for) Home PNA. The MII conforms to the ISO/IEC 802-3 standards.
The first Ethernet controller is used to interface LAN & WAN.

B. Reset Circuit

The Reset circuit generates reset pulse to CPU(RESET-) by initiated JTAG emulator, peripheral reset signal from CPU on the MBU, watch-dog signal, reset switch and power on reset. Power ON reset occurs at voltage detection IC(U4) at the moment when +3.3V power falls down to +2.7V. The main CPU of MBU can reset VOIB by PP reset signal(PPRESET).

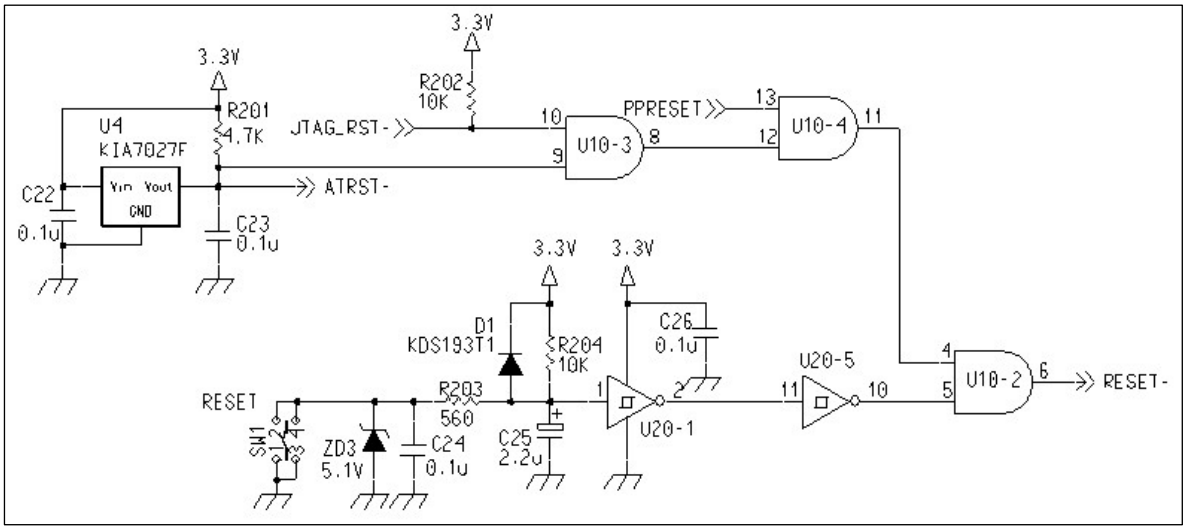


Figure 3.9.2 Reset circuit

C. Clock generation

Local oscillator(X1) generates 10MHz clock and provides it to CPU through Spread Spectrum clock generator (U22). PLL block of micro-controller multiplies it to generate 133MHz clock for internal CPU clock and external bus clock.

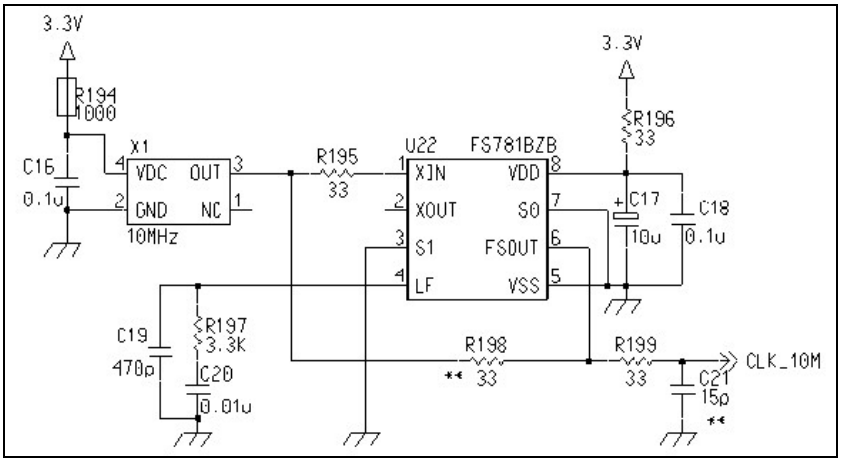


Figure 3.9.3 CPU Clock generation

D. DSP circuit

The AC48204 voice processor supports low-bit-rate voice, fax and data communication for up to four independent PCM channels. For voice transmission, the system receives digitized voice originating from an external PCM codec and compresses it to one of the supported standards. Fax and data transmissions are automatically detected and demodulated by the integrated NetFax Engine. The AC48204 transfers the resultant bit-stream for every channel in packets to the Host processor through the integral Host Port Interface.

The AC48204 performs receive and transmit operations simultaneously. It receives compressed and packetized PCM speech from a remote VOIP unit through the Host Port Interface. It decompresses the PCM speech and transmits it through the PCM voice interface. It also re-modulates and transmits fax/data signals to the fax machine or data modem in analog form. The fax/data relay process is transparent for the transmitting and receiving fax machines or data modems.

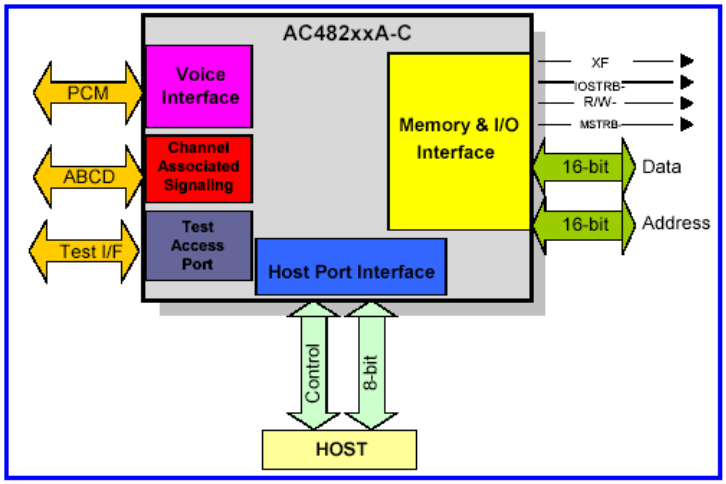


Figure 3.9.4 AC48204 Block diagram

Voice interface is implemented by buffered serial port(BSP) of DSP that consists of PCM In(BDR), PCM Out(BDX), 2MHz clock(BCLK) and 125us Frame(BFS) signals. The BSP is connected to MPX PCM bus(MPX, MTX, 2M_CLK and F_SYNC) of ACT-II(U7).

Micro-controller of VOIB controls DSP operations and transmits/receives compressed data to/from DSP through 8bits

HPI. The DSP requires SRAM(U51, 256K X 16bits, 8ns) for data memory.
Oscillator(X5) generates 20MHz clock and provides it to DSP through Spread Spectrum clock generator (U23). PLL block of DSP multiplies it to generate 100MHz internal core clock.

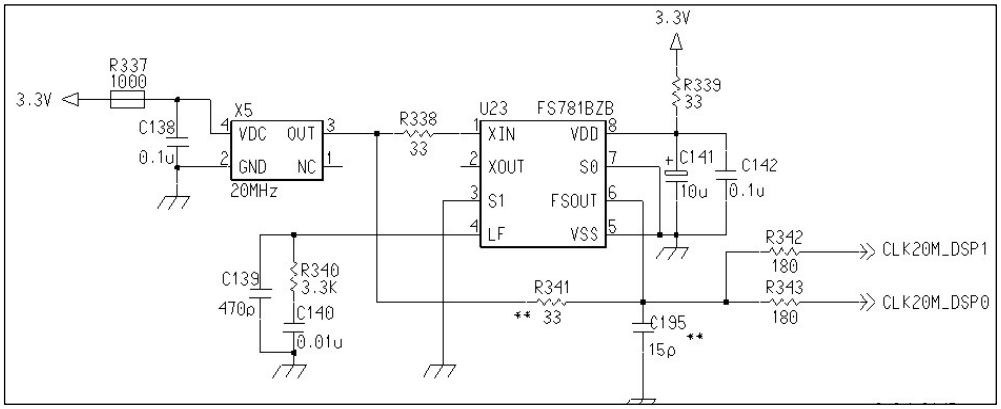


Figure 3.9.5 DSP Clock generation

E. ACT-2 and FPGA circuit

The ACT-2 is a custom Mixed-Signal ASIC device used to construct a small to medium size digital key telephone system. It is designed to support most functions of the digital key telephone system by enhance existing ASIC device, ACT-1.
The ACT-2 provides three major functions of GSXD, DBID and GSL12. And also, the ACT-2 has on chip DSP and memory to support DTMF, CPT and CID detection and generation.

The DBID(Digital Back plane Interface Device) part of the ACT-2 provides high-speed synchronous data channels for inter-card and control communications. The device also provides the mechanism for transmit and receive highway time slot assignment for the system B and D channels. The micro-controller on VOIB controls the ACT-2 on this peripheral board directly by initializing internal registers through CPU interface block.
MPX bus of the ACT-2 are TXB0 and RXB0, labeled with MTX and MRX, transmits/receives 32 channels of PCM data to/from buffered serial port(BSP) of DSP. Eight channels(4 for VOIB and 4 for VOIU) of MPX bus are used to for PCM channels.
Voice B channels are transmitted/received to/from system highway for switching by time slot assignment function of DBID. System highway, TX_ISC1 and RX_ISC1, carries 48 B channels with FRAME signals..

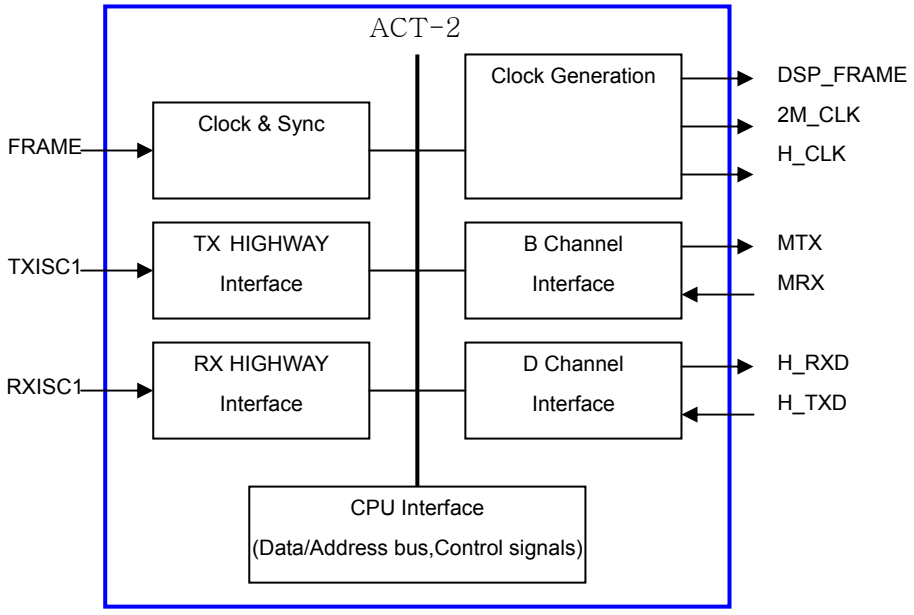


Figure 3.9.6 act-2 block diagram

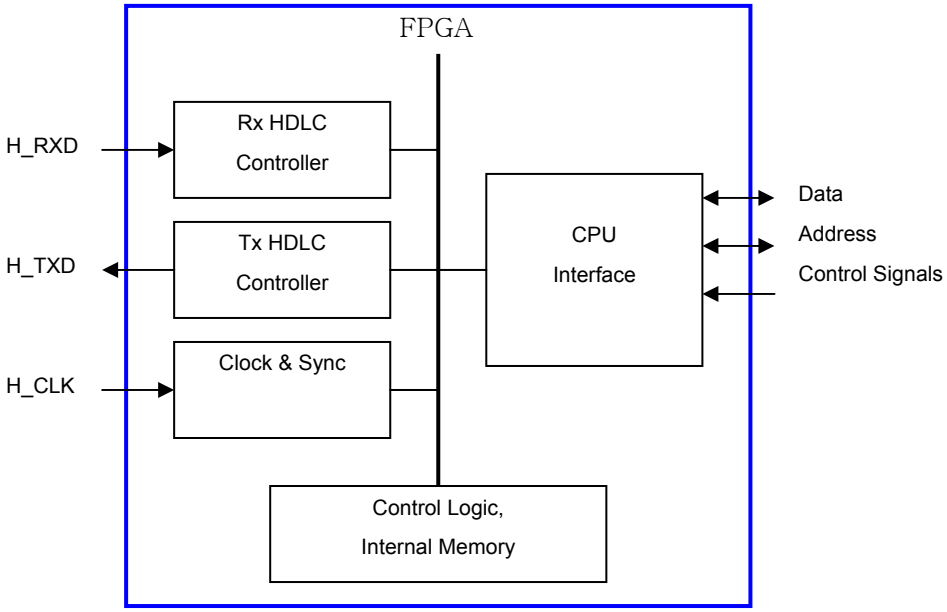


Figure 3.9.7 FPGA block diagram

A FPGA(U54) provides 1 channel HDLC(High-level Data Link Control) for data communication between main CPU on MBU and local micro-controller on VOIB. HDLC interface port(H_CLK, H_TXD and H_RXD) is used for communication and its transmission rate is 512Kbps.

E. Ethernet interface circuit

The MII supplies the transmission and reception clocks of 25MHz for 100M-bps operation, 2.5 MHz for the 10Mbps speed or 1MHz for (the 1M-bps for) Home PNA. The MII conforms to the ISO/IEC 802-3 standards.
The first Ethernet controller is used to interface LAN & WAN.

Ethernet interface circuit consists of 10/100BaseTX/FX MII Physical Layer Transceiver with Auto cross-over(U52, KSZ8721), line interface circuit. Data transformer T1 protects the secondary circuits from high voltage surge.

Item	Specifications
LAN Interface	10 / 100 Base-T Ethernet (IEEE 802.3)
Speed	10 Mbps or 100 Mbps (Auto-Negotiation)
Duplex	Half Duplex or Full Duplex (Auto-Negotiation)
VoIP Protocol	H.323 Revision 3
Voice Compression	G.711/G.726/G729/G.723.1
Voice/Fax Switching	T.38
Echo cancellation	G.165

Table 3.9.3 VOIP Specifications

F. Power circuit

There are five power sources that is 3.3V, 1.8V,1.8V_A, 2.5V and 1.2V in the VOIB.
The CPU, its peripheral circuit, DSP and memory devices and some logic chips require 3.3V power(3.3V) that is generated by U12. The DSP needs dual power supply of 1.8V for core and 3.3V for its peripheral blocks and power

regulator(U114) provides DSP with 1.8V. 2.5V power for Physical Layer Tranceiver(KSZ8721) is supplied by itself. In addition, 1.2V for FPGA is generated by U55.

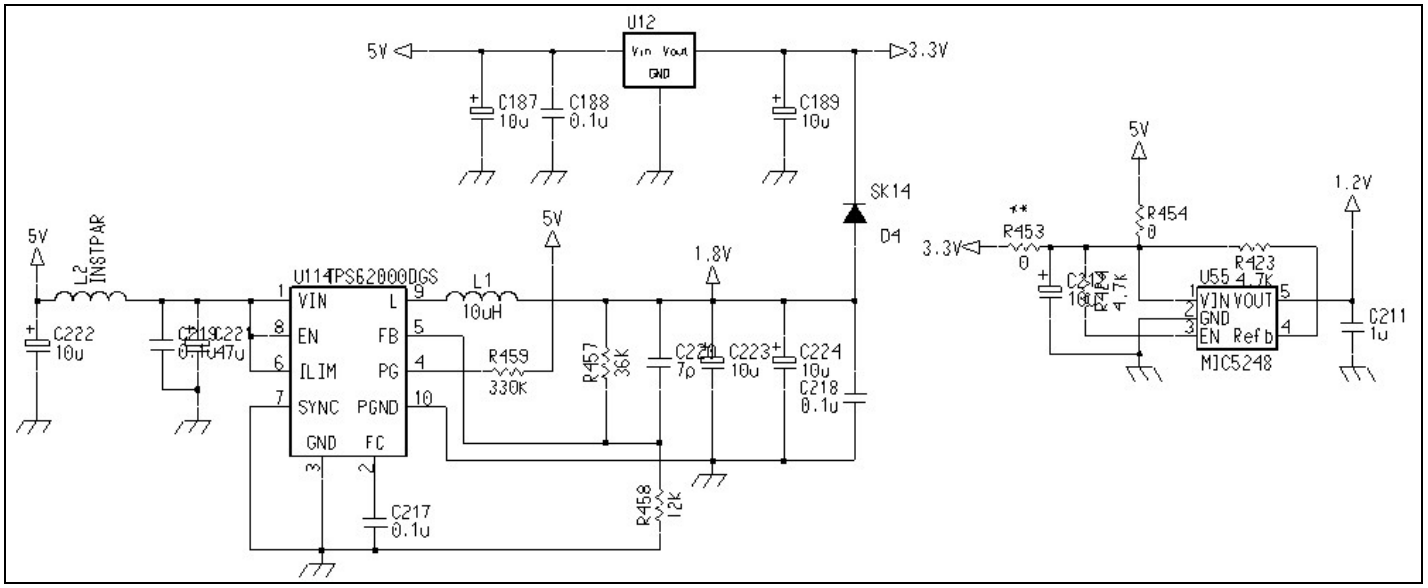


Figure 3.9.8 Power circuit

3.9.4 Meaning of Connectors, Switches and LEDs

There are various kinds of connectors, switches and LEDs in the VOIB.

Figure 3.9.9 VOIB Layout shows the configuration of VOIB and the location of connectors, switches and LEDs.

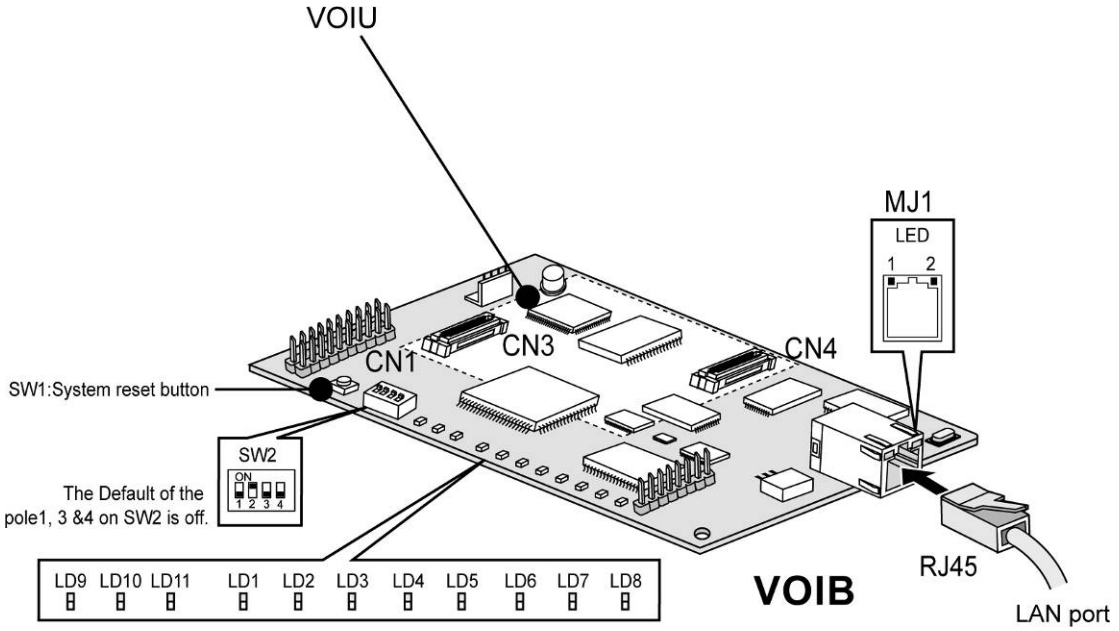


Figure 3.9.9 VOIB Layout

Switch / Connector	Functions	Remark
SW1	VOIB Reset Switch for CPU (S32510A)	
SW2	Pole1: Boot mode selection, others: reserved	Default: all OFF
CN1	JTAG(Joint Test Action Group) for debug	
CN2	RS232C Trace Tool Connection	
CN3	VOIU Board Connection	
CN4	VOIU Board Connection	
CN5	MBU Connection	
MJ1	Network(RJ-45) Cable Connection	

Table 3.9.4 Various switches and connectors functions

LED	Functions	Remark
LD1	Channel1 Seize indication LED (ON: Busy, OFF: Idle)	
LD2	Channel2 Seize indication LED (ON: Busy, OFF: Idle)	
LD3	Channel3 Seize indication LED (ON: Busy, OFF: Idle)	
LD4	Channel4 Seize indication LED (ON: Busy, OFF: Idle)	
LD5	Channel5 Seize indication LED (ON: Busy, OFF: Idle)	
LD6	Channel6 Seize indication LED (ON: Busy, OFF: Idle)	
LD7	Channel7 Seize indication LED (ON: Busy, OFF: Idle)	
LD8	Channel8 Seize indication LED (ON: Busy, OFF: Idle)	
LD9	VOIU DSP operation status LED (ON: Normal, OFF: Fail)	
LD10	VOIB DSP operation status LED (ON: Normal, OFF: Fail)	
LD11	DSP HINT interrupt LED (ON: Active, OFF: Idle)	
MJ1-LD1(yellow)	Speed Status LED (ON: 100Mbps operation, OFF: 10Mbps)	
MJ1-LD2(green/orange)	Link Status LED (ON: Link, Toggle: Data transfer)	

Table 3.9.5 LED indications

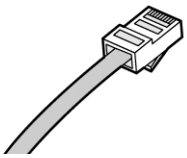
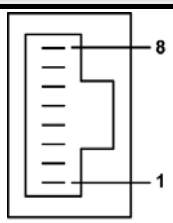
Connector	Pin Number	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	Reserved	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

Table 3.9.6 MJ1 Pin assignment

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN4	A1-A2	3.3V_1	+3.3V power for DSP	B1-B2	3.3V_1	+3.3V power for DSP
	A3-A8	HD(0)-HD(5)	Data bus to HPI8	B3-B8	GND	Ground
	A9	HD(6)	Data bus to HPI8	B9		NC
	A10	HD(7)	Data bus to HPI8	B10		NC
	A11-A13	GND	Ground	B11-B13	GND	Ground
	A14	HINT1-	DSP INT to CPU	B14	BF_SYNC	8KHz Frame sync
	A15	GND	Ground	B15	B2M_CLK	Clock 2MHz for MPX
	A16	MRX1	MPX bus RX	B16	BMTX	MPX bus TX
	A17	GND	Ground	B17	GND	Ground
	A18	VOIU_DET	VOIU detect: Note (a)	B18	GND	Ground
	A19-A20	GND	Ground	B19-B20	GND	Ground

Table 3.9.7 CN4 Pin assignment

NOTE

(a) VOIU_DET is read by micro-controller on VOIB through port8 to detect whether VOIU is installed or not. Corresponding pin on VOIU side is tied to ground.

CNNT	Pin Number	Pin name	Description	Pin Number	Pin Name	Description
CN3	A1-A4	3.3V_1	+3.3V power for DSP	B1-B4	3.3V_1	+3.3V power for DSP
	A5-A7	1.8V_1	+1.8V power for DSP	B5-B7	1.8V_1	+1.8V power for DSP
	A8	MA(0)	Address0 to HBIL	B8	GND	Ground
	A9	MA(1)	Address1 to HR_W	B9		
	A10	MA(2)	Address2 to HCNTL0	B10		
	A11-A12	GND	Ground	B11-B12		
	A13	MA(3)	Address3 to HCNTL1	B13		
	A14	MWBE0-	Write enable	B14		
	A15	OE-	Read(output) enable	B15		
	A16	GND	Ground	B16	CLK20M_DSP1	Clock 20MHz to DSP
	A17	R_B1-	HRDY from DSP	B17	HCS1-	HPI chip selection
	A18	VOIU_LED	Note (a)	B18	HRESET-	DSP reset signal
	A19-A20	GND	Ground	B19-B20	GND	Ground

Table 3.9.8 CN3 Pin assignment

3.10 PSU (Power Supply Unit)

3.10.1 Block Diagram

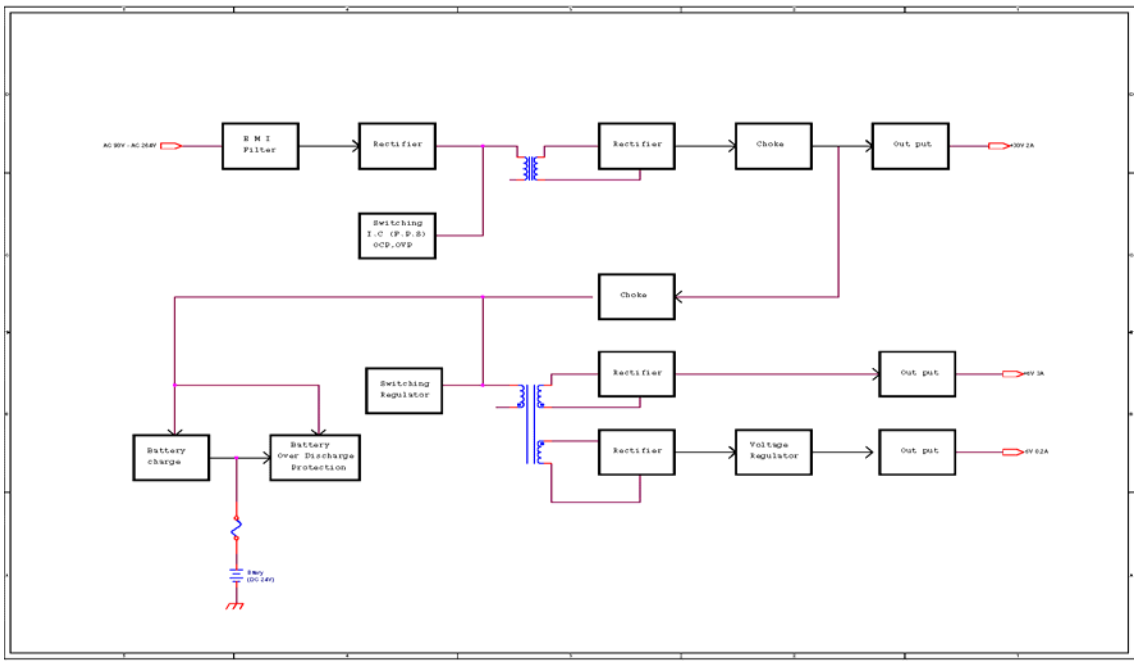


Figure 3.10.1 Block diagram of PSU

3.10.2 Operation description

This unit is Switching Mode Power Supply using PWM method.
And is formed of 2 switching parts that is separated and controlled Voltage Mode Control

A. +30V generation circuit

This switching power circuit generates +30VDC for digital terminal and single line telephone, respectively.
VO power varies from 22V to 30V depending on AC Power supply. When AC power is failed, VO is provided from system back-up batteries and is ranged from 22V to 24V. In normal situation, VO is provided from PSU and is steady +30V.
This circuit produces stable DC power for digital terminal and single line telephone regardless of AC power variation.
It is composed of PWM controller (U1), power transformer (T1), rectification circuit (RC) and feedback circuit.

B. +30V Output (AC/DC PART)

1) Input Filter
   It lays restraint on noise to come into the input line and out to the switching part.
2) Input Rectifier & Smoothing
   Transfer AC input to DC voltage rectified.
3) PWM Control & Switching
   It has skill that occurs to the steady rated voltage from feedback signal according to changing the load and input condition by PWM. Also, If current is over limit point, it controls output by detecting from is pin.
4) Transformer
   Transfer firstly part voltage to secondary part.
5) Auxiliary Power Supply
   Supply with VCC for driving the PWM controller.
6) Output Rectifier & Smoothing
   Transfer square wave supplied from transformer to DC voltage rectified.

C. +5V, -5V Output (DC/DC PART)

1) PWM Control
   It has skill that occurs to the steady rated voltage from feedback signal according to changing the load and input condition by PWM.
   Also, if current is over limit point, it controls output by detecting from is pin.
2) Drive Circuit
   Single pulse supplied from PWM IC provides switching FET with each crossed pulses.
3) Switching
   It drives switching FET by each crossed pulse.
   It is made of Synchronized Buck Converter.
4) Inductor (Transformer)
   As switching, energy driven by inductor is transferred to +5V output part. Also as this inductor consisted of transformer it is transferred to – 5V output part.
5) Output Rectifier & Smoothing

Transfer square wave supplied from transformer to DC voltage rectified.

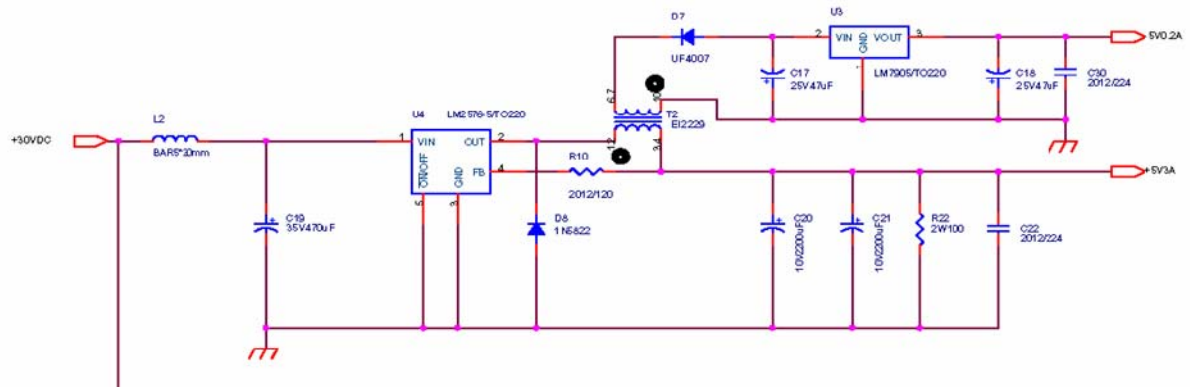


Figure 3.10.2 +5V, -5V generation circuit

D. Backup battery circuit

The battery charging power is generated by switching regulator (U5) and this switching regulator generates battery charging voltage +27.3V with current limitation of 100mA. And this voltage can be changed by adjusting the variable resistor (VR1).
When the AC input power fails, the pin #1 of U6 goes low (0V) and it turns the FET, Q3, on for supplying the system power from external battery. If battery voltage goes lower than 21.5V, the pin #1 of U1 goes high and it turns the Q3 off and this situation protects the battery from over-discharging. The battery discharging voltage can be adjusted by using variable resistor VR2. Fuse (F2, 250V/5A) protects the system from outside short circuit.

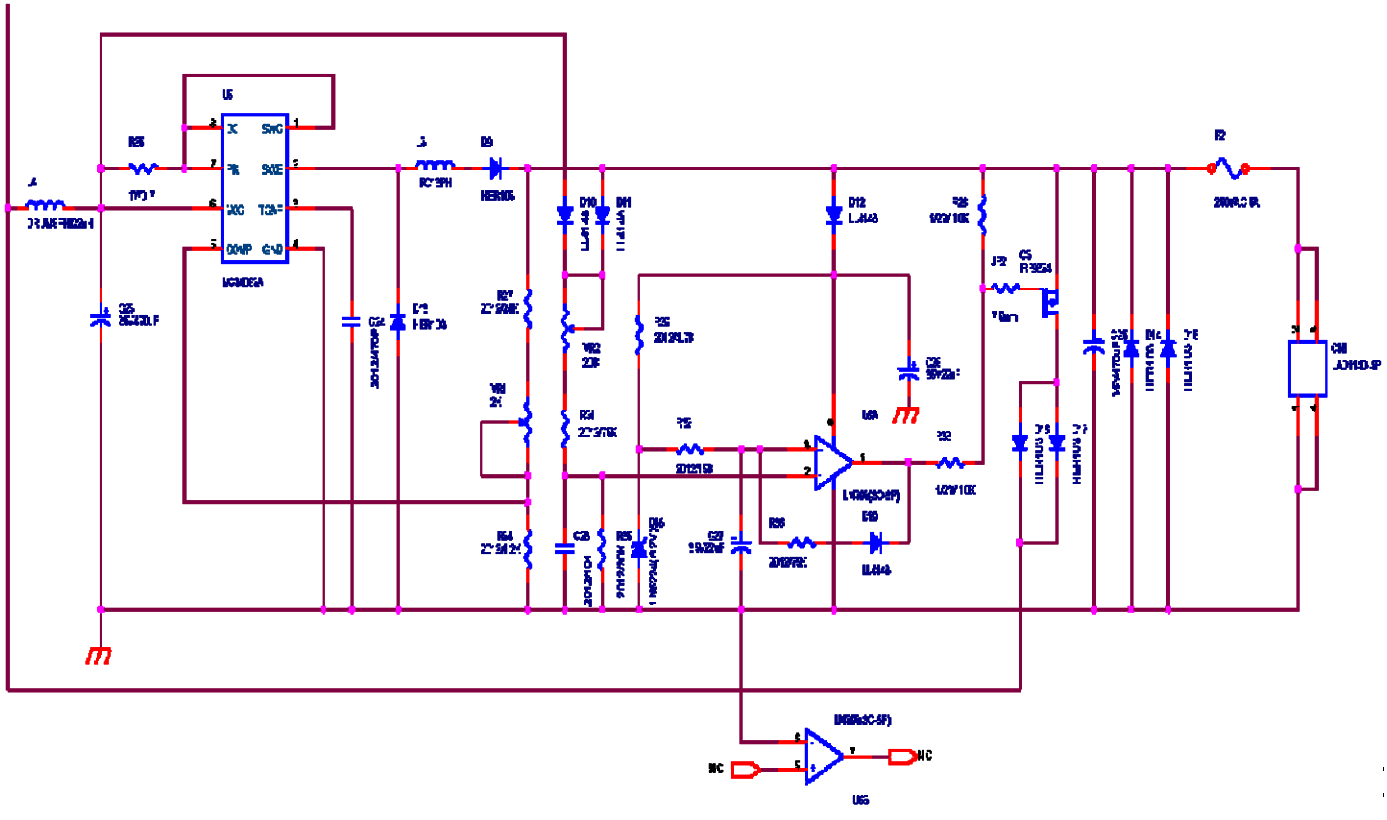
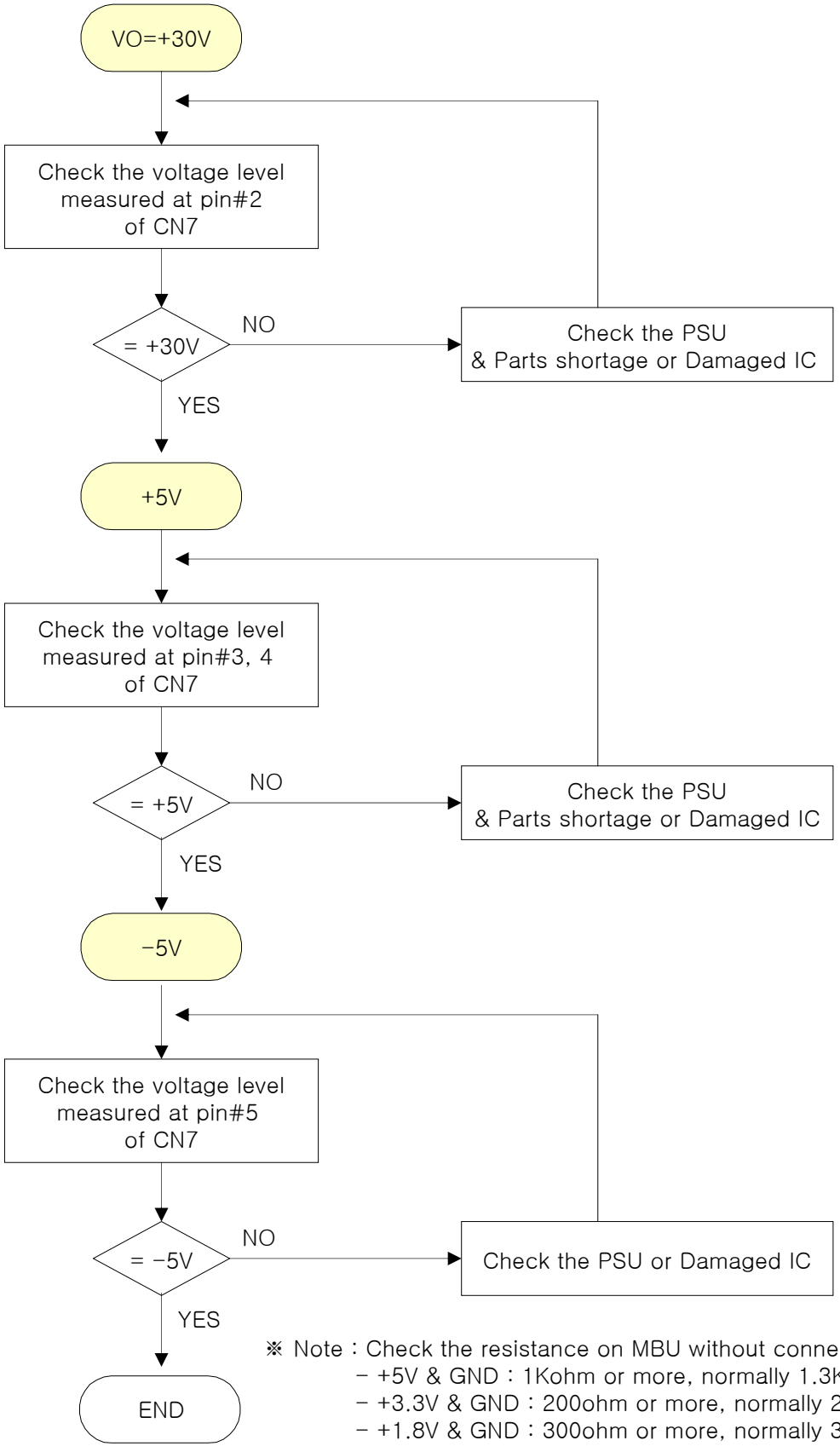


Figure 3.10.3 Backup battery circuit

SECTION 4. TROUBLESHOOTING

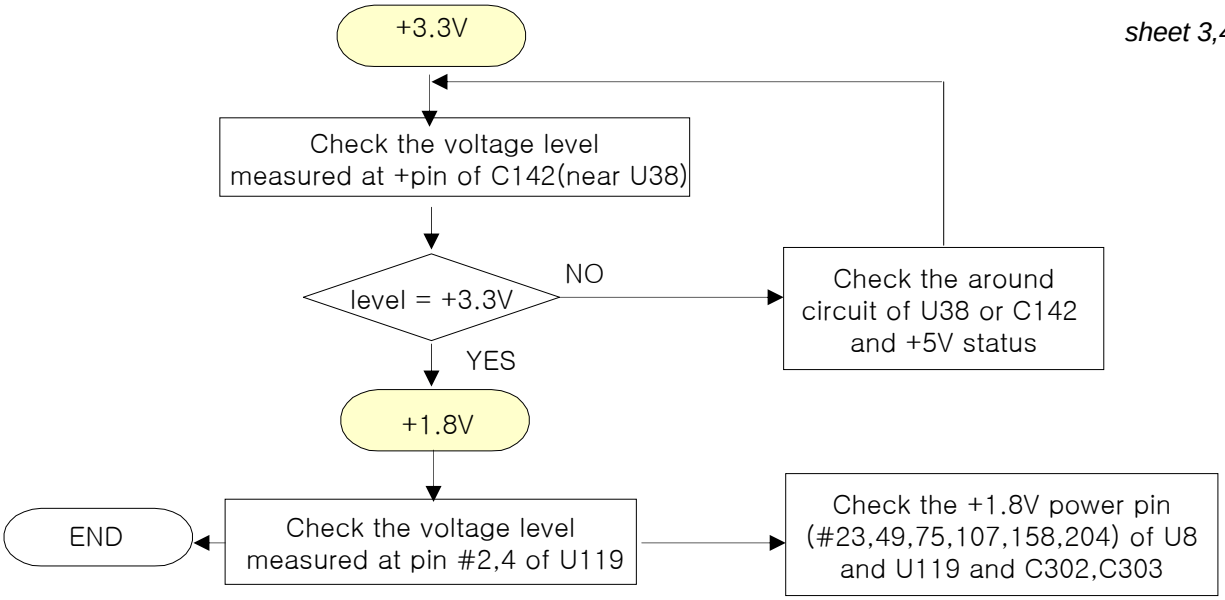
1. MBU

1.1 Power check from PSU (VO = +30V, +5V, -5V)

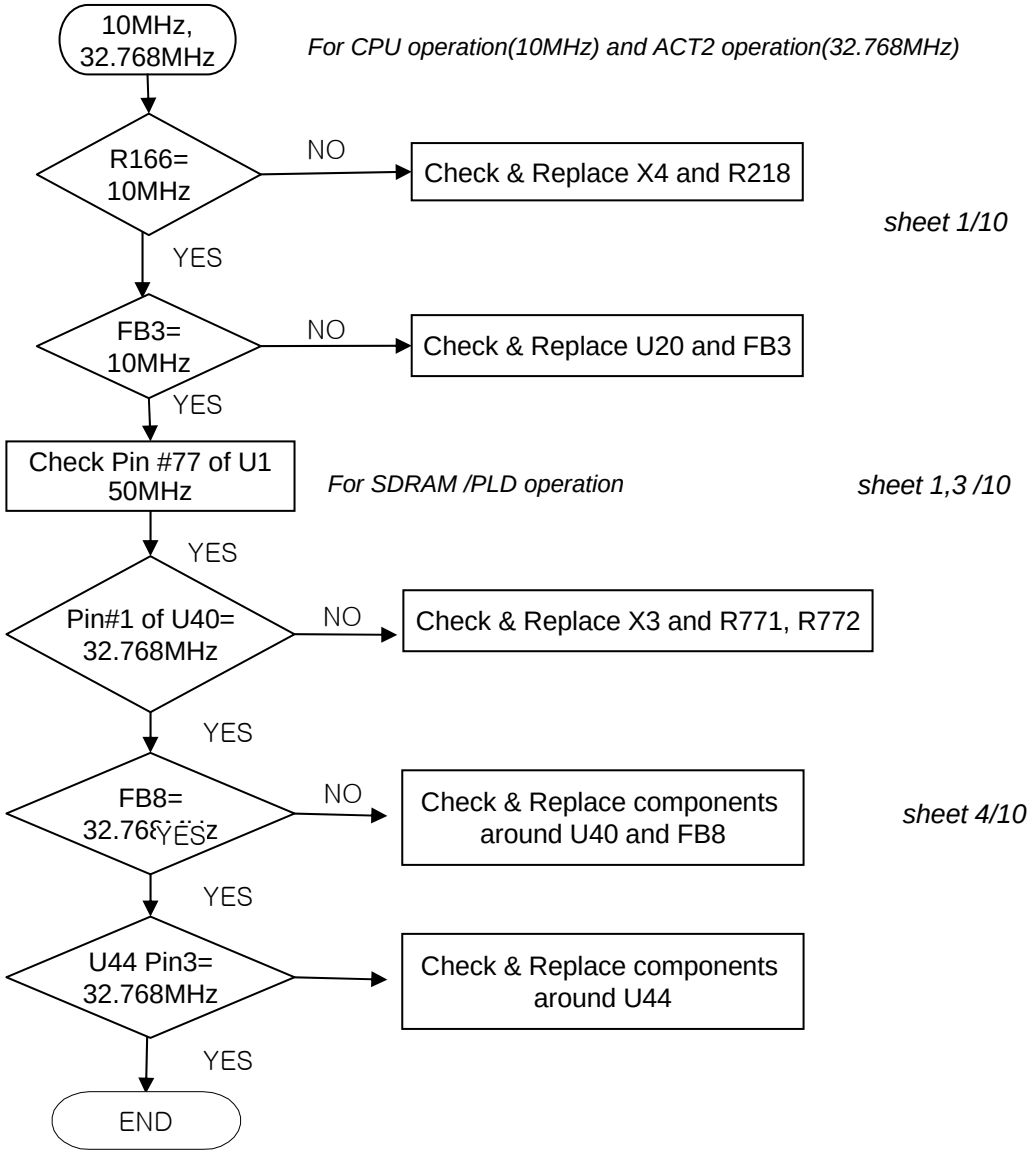


※ Note : Check the resistance on MBU without connecting PSU
- +5V & GND : 1Kohm or more, normally 1.3Kohm
- +3.3V & GND : 200ohm or more, normally 210ohm
- +1.8V & GND : 300ohm or more, normally 330ohm

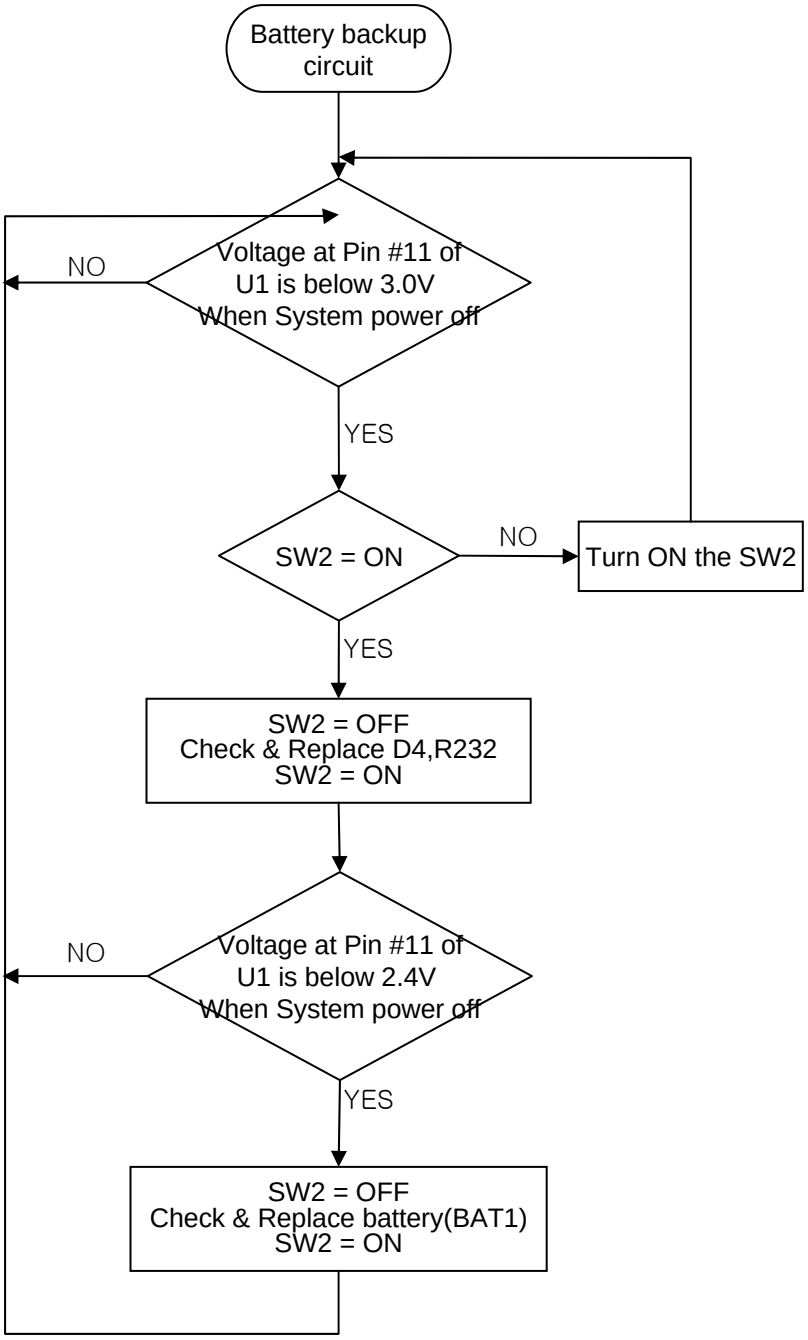
1.2 +3.3V & +1.8V Power Status



1.3 Clock Check (10MHz,50MHz, 32.768MHz)

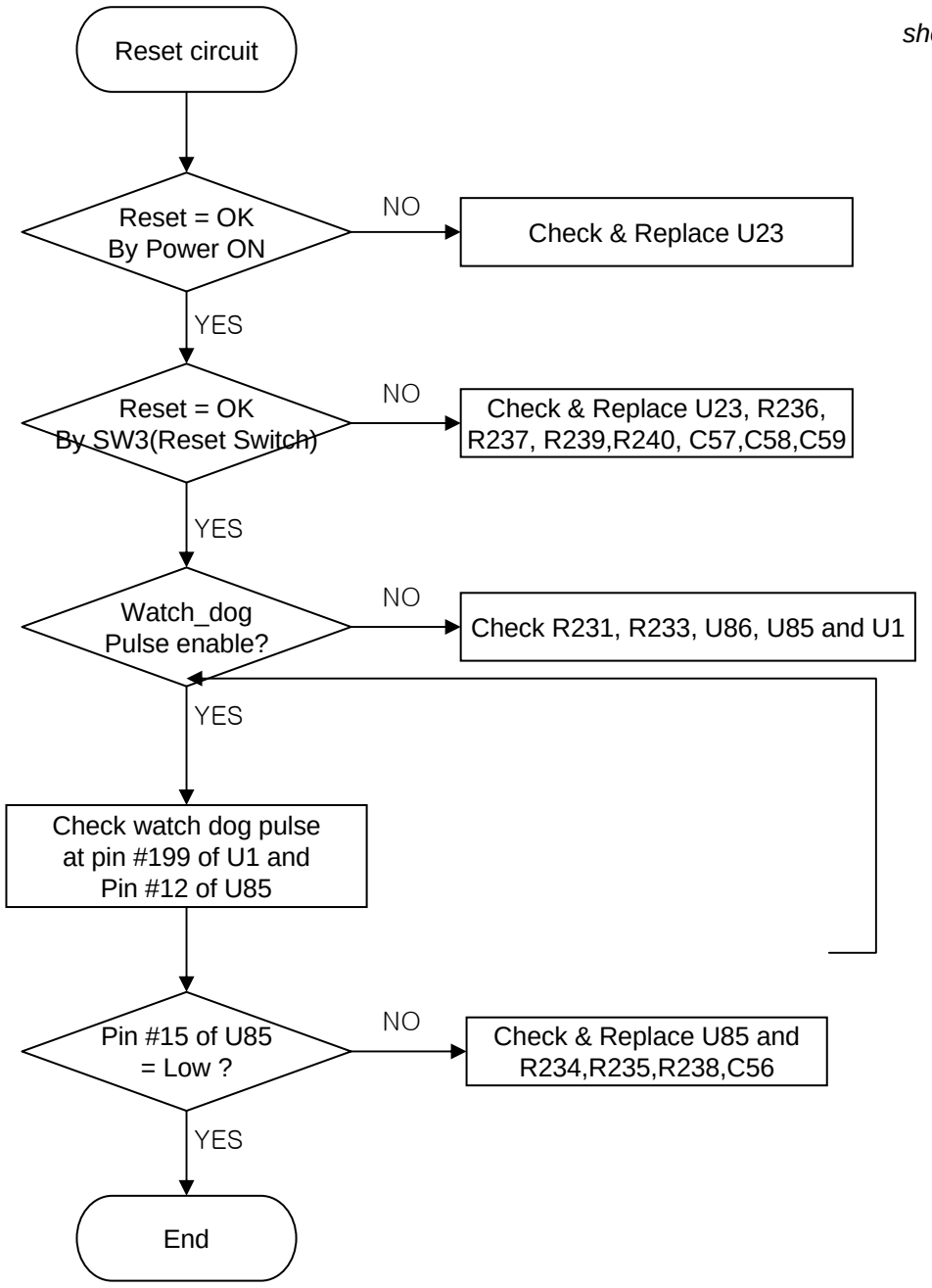


1.4 Battery back up circuit(for SRAM & RTC)

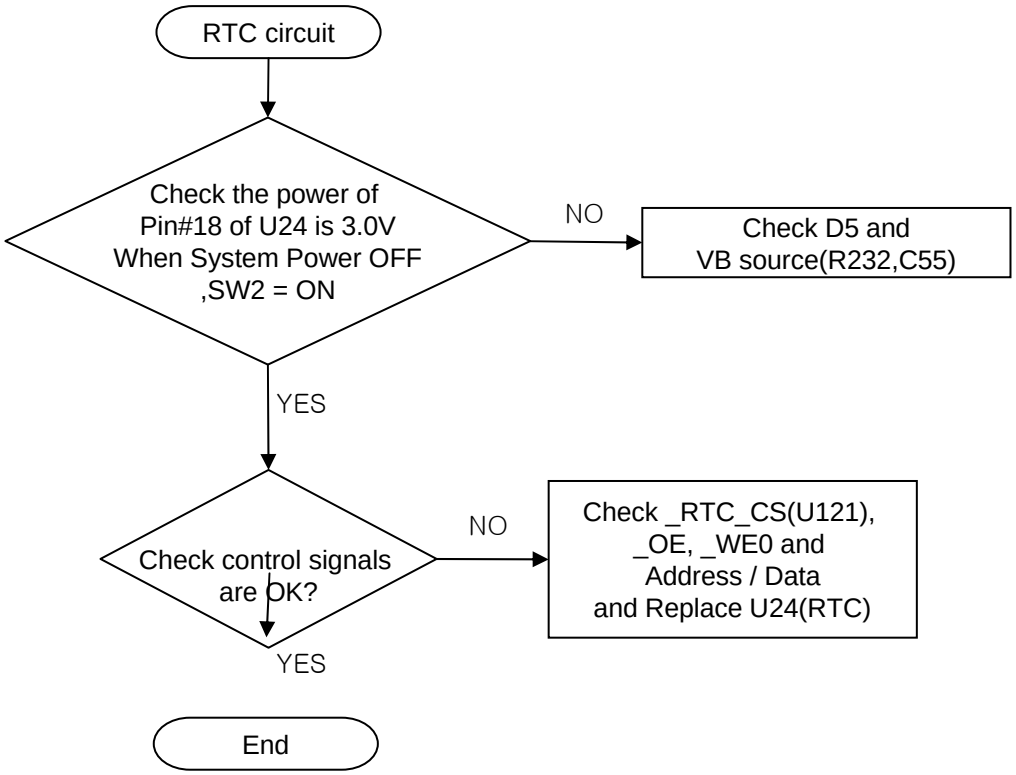


1.5 Reset and Watch dog circuit

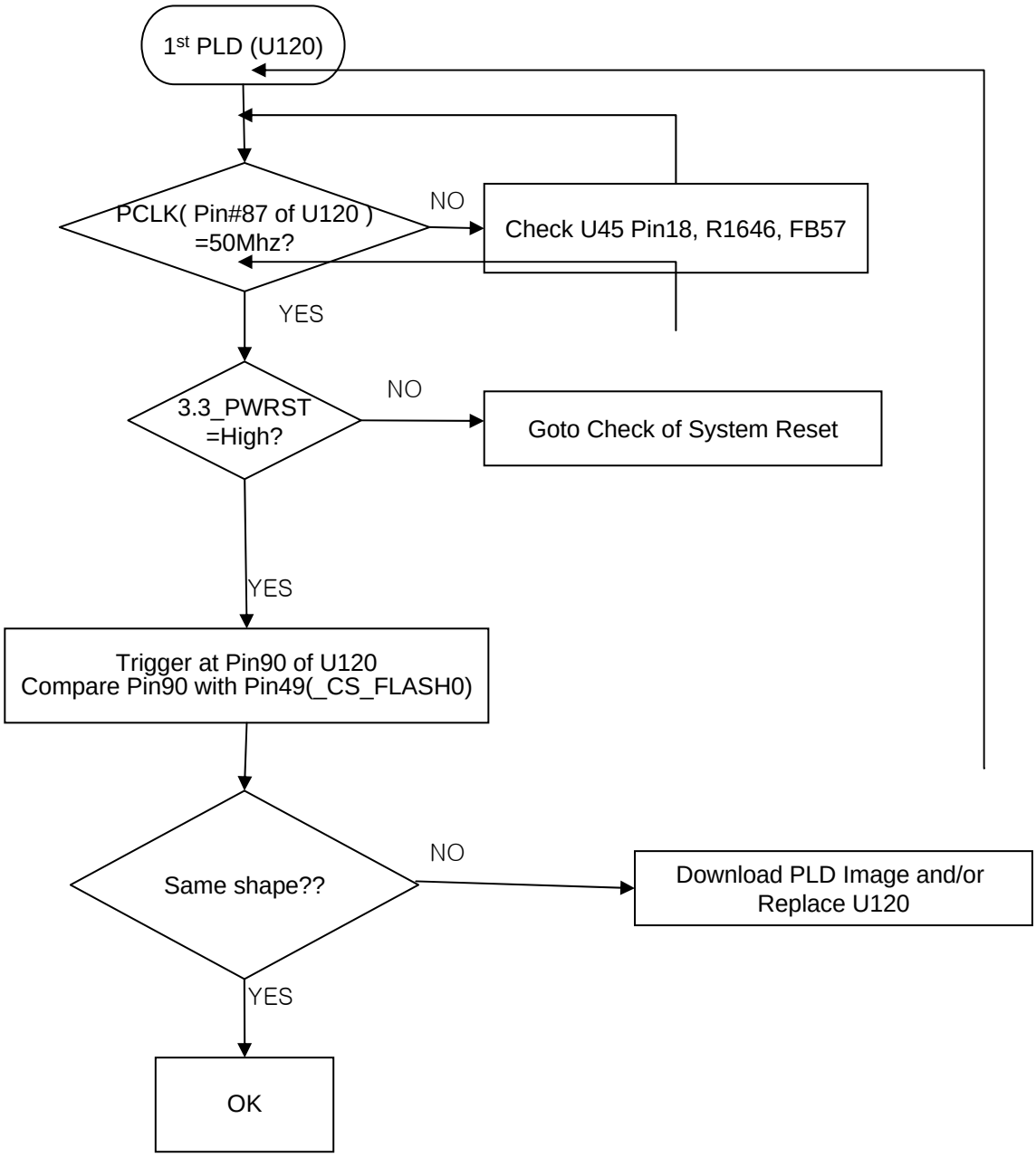
sheet 2/10



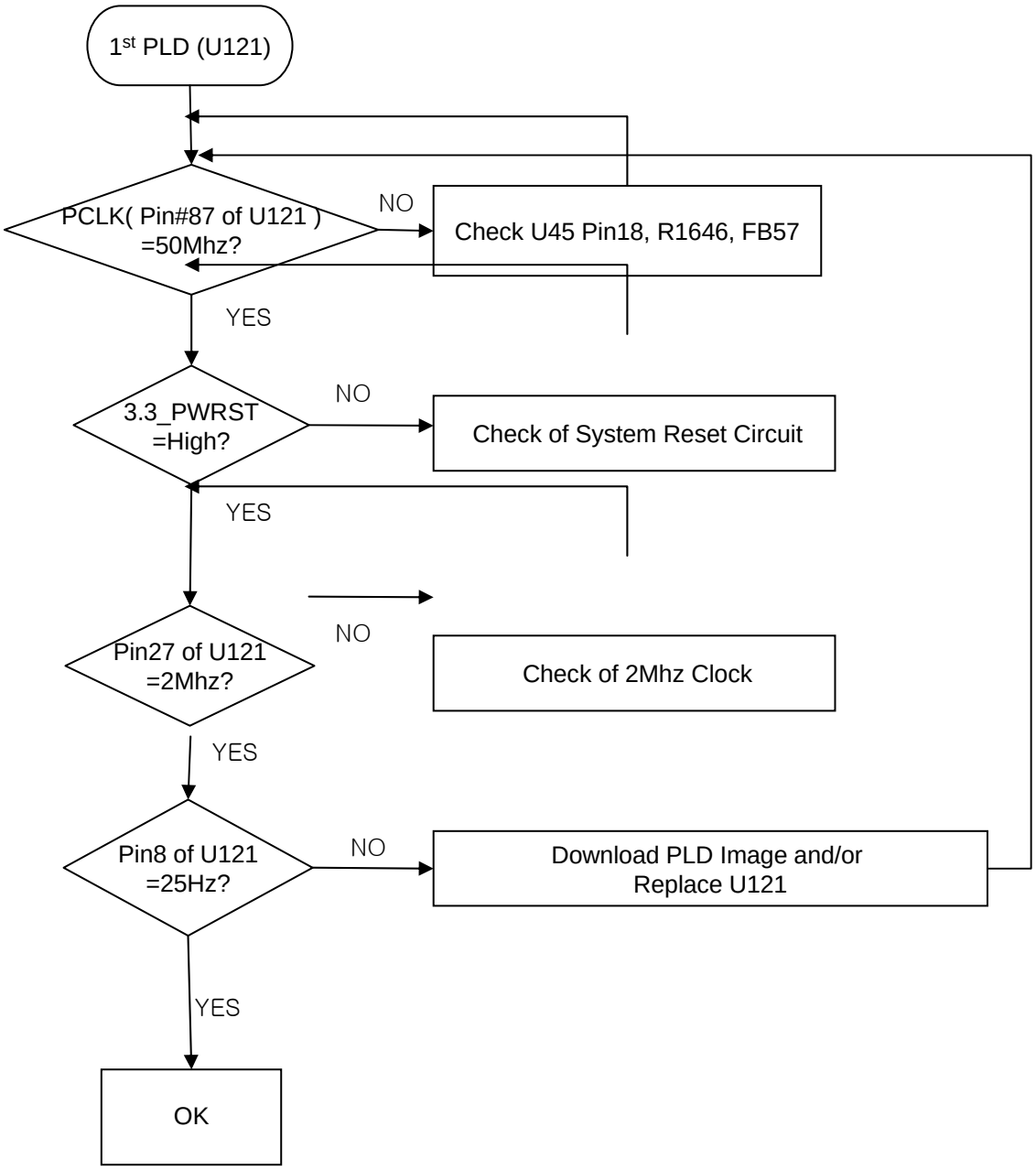
1.6 Real Time Clock(RTC) circuit



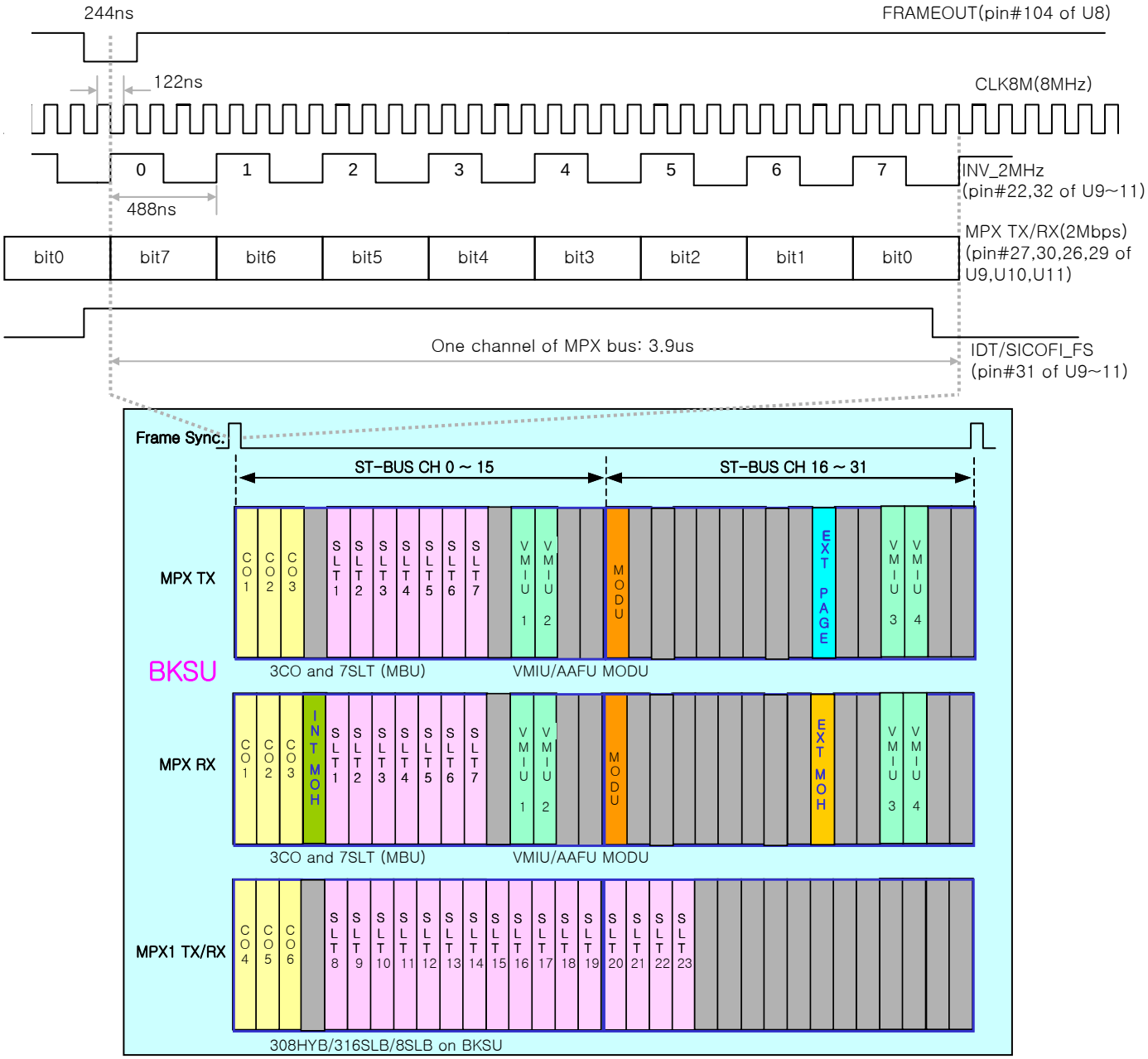
1.7 1st PLD Circuit



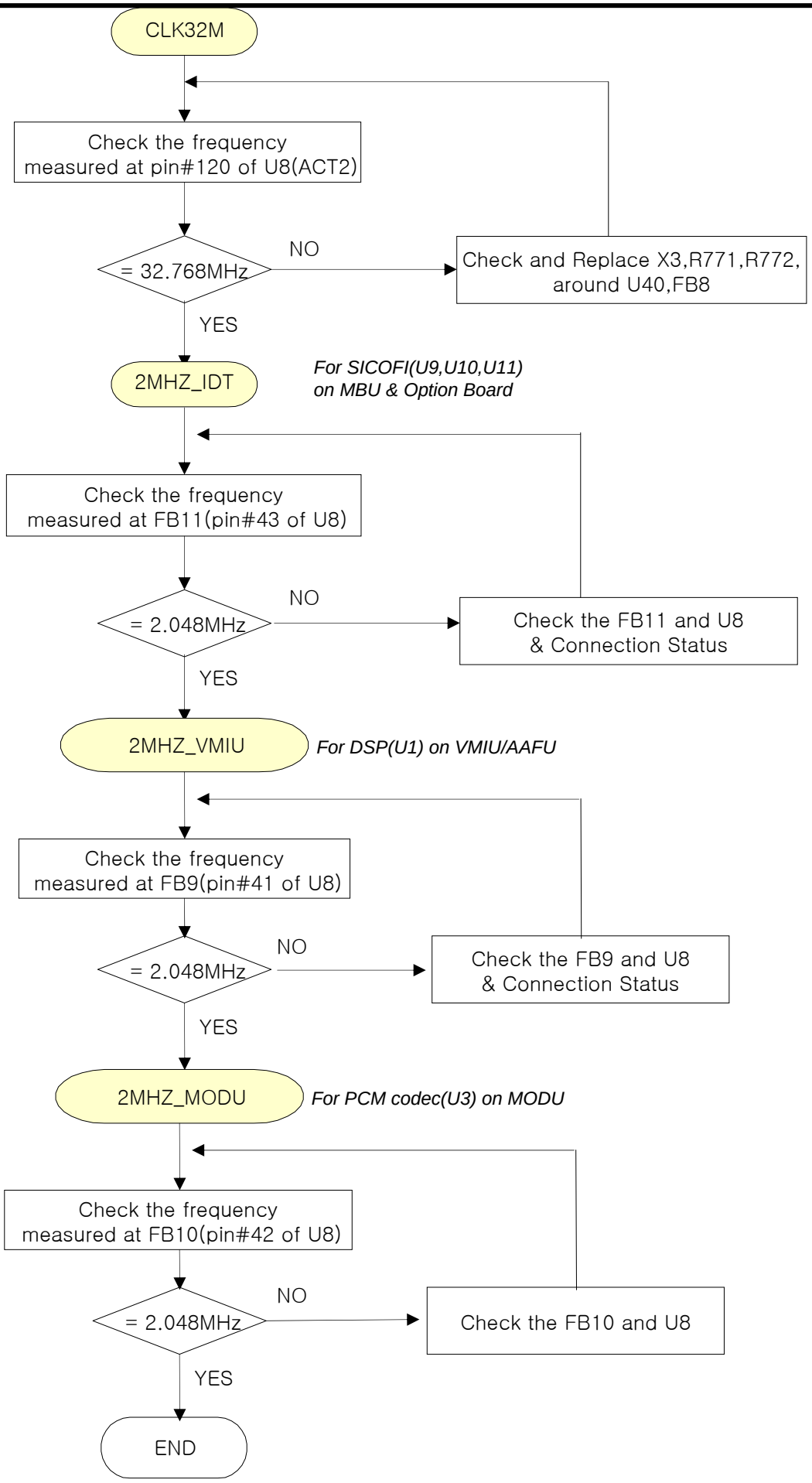
1.8 2nd PLD Circuit

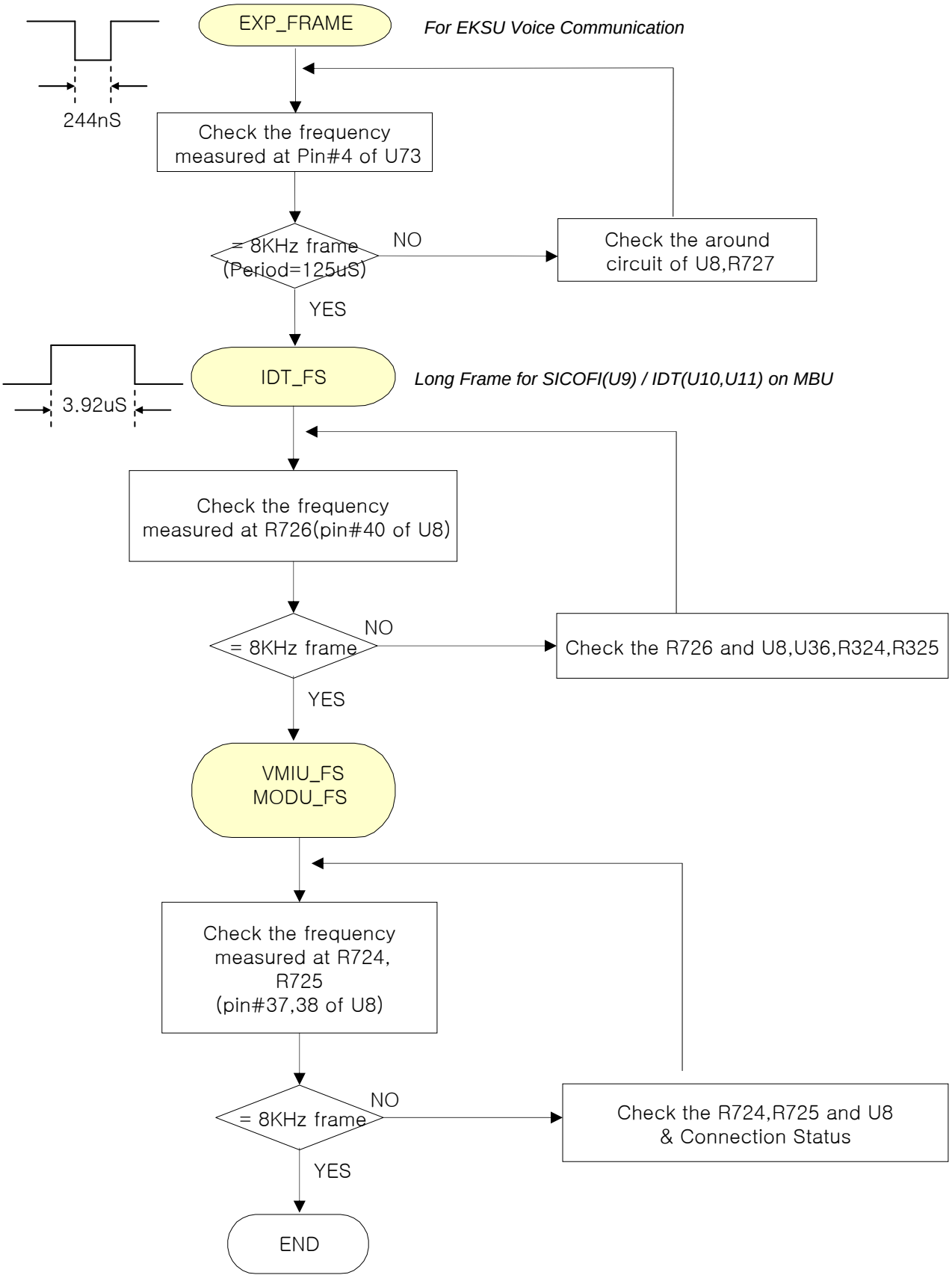


1.9 Clock generation circuit



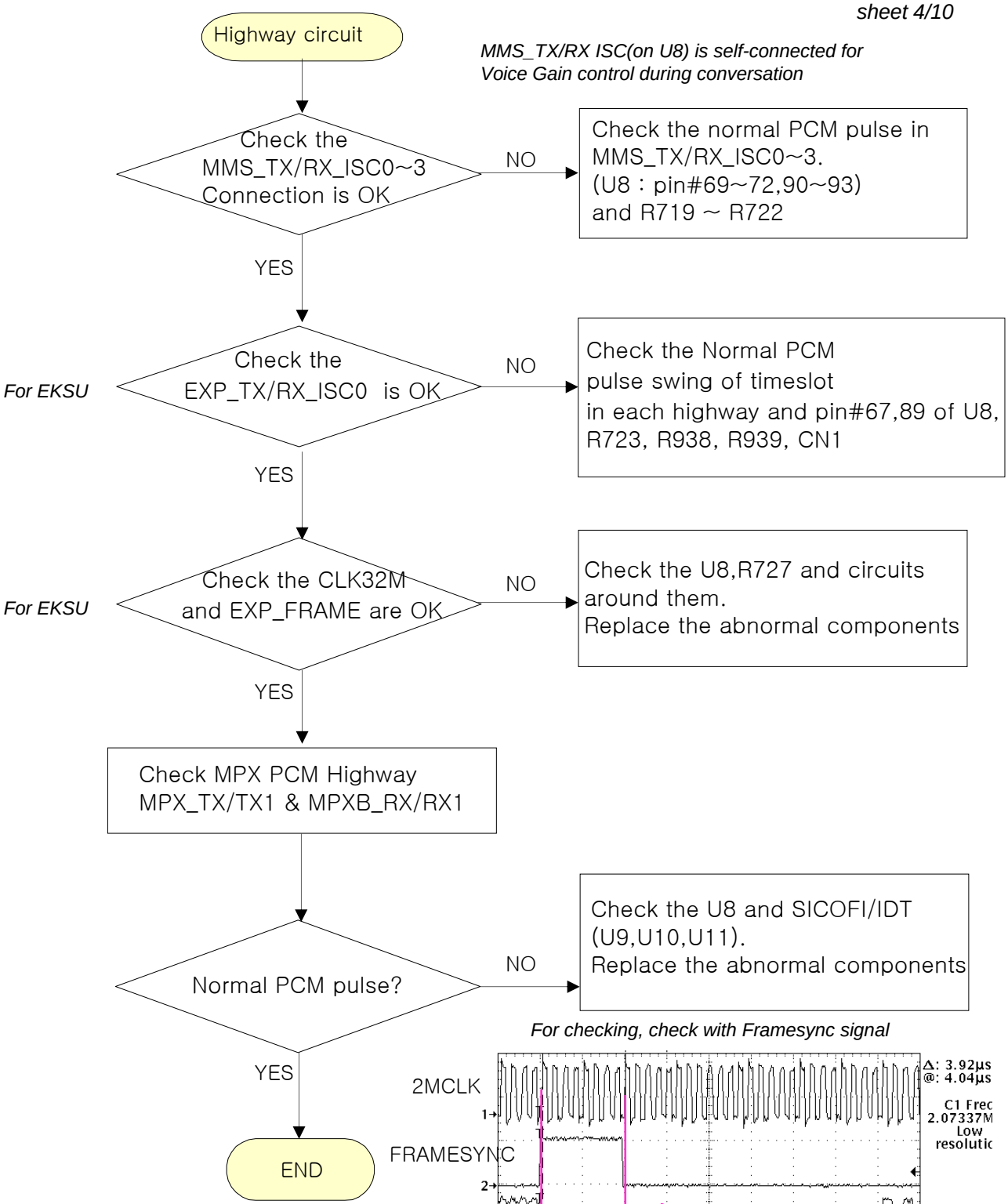
< Clock generation and MPX PCM highway >


CLK32M
Check the frequency measured at pin#120 of U8(ACT2)
= 32.768MHz
NO
Check and Replace X3,R771,R772, around U40,FB8
YES
2MHZ_IDT
For SICOFI(U9,U10,U11) on MBU & Option Board
Check the frequency measured at FB11(pin#43 of U8)
= 2.048MHz
NO
Check the FB11 and U8 & Connection Status
YES
2MHZ_VMIU
For DSP(U1) on VMIU/AAFU
Check the frequency measured at FB9(pin#41 of U8)
= 2.048MHz
NO
Check the FB9 and U8 & Connection Status
YES
2MHZ_MODU
For PCM codec(U3) on MODU
Check the frequency measured at FB10(pin#42 of U8)
= 2.048MHz
NO
Check the FB10 and U8
YES
END


EXP_FRAME
For EKSU Voice Communication
244nS
Check the frequency measured at Pin#4 of U73
= 8KHz frame (Period=125uS)
NO
Check the around circuit of U8,R727
YES
IDT_FS
Long Frame for SICOFI(U9) / IDT(U10,U11) on MBU
3.92uS
Check the frequency measured at R726(pin#40 of U8)
= 8KHz frame
NO
Check the R726 and U8,U36,R324,R325
YES
VMIU_FS
MODU_FS
Check the frequency measured at R724, R725 (pin#37,38 of U8)
= 8KHz frame
NO
Check the R724,R725 and U8 & Connection Status
YES
END

1.10 System Highway and MPX PCM Highway circuits

sheet 4/10



1.11 Internal MOH circuit

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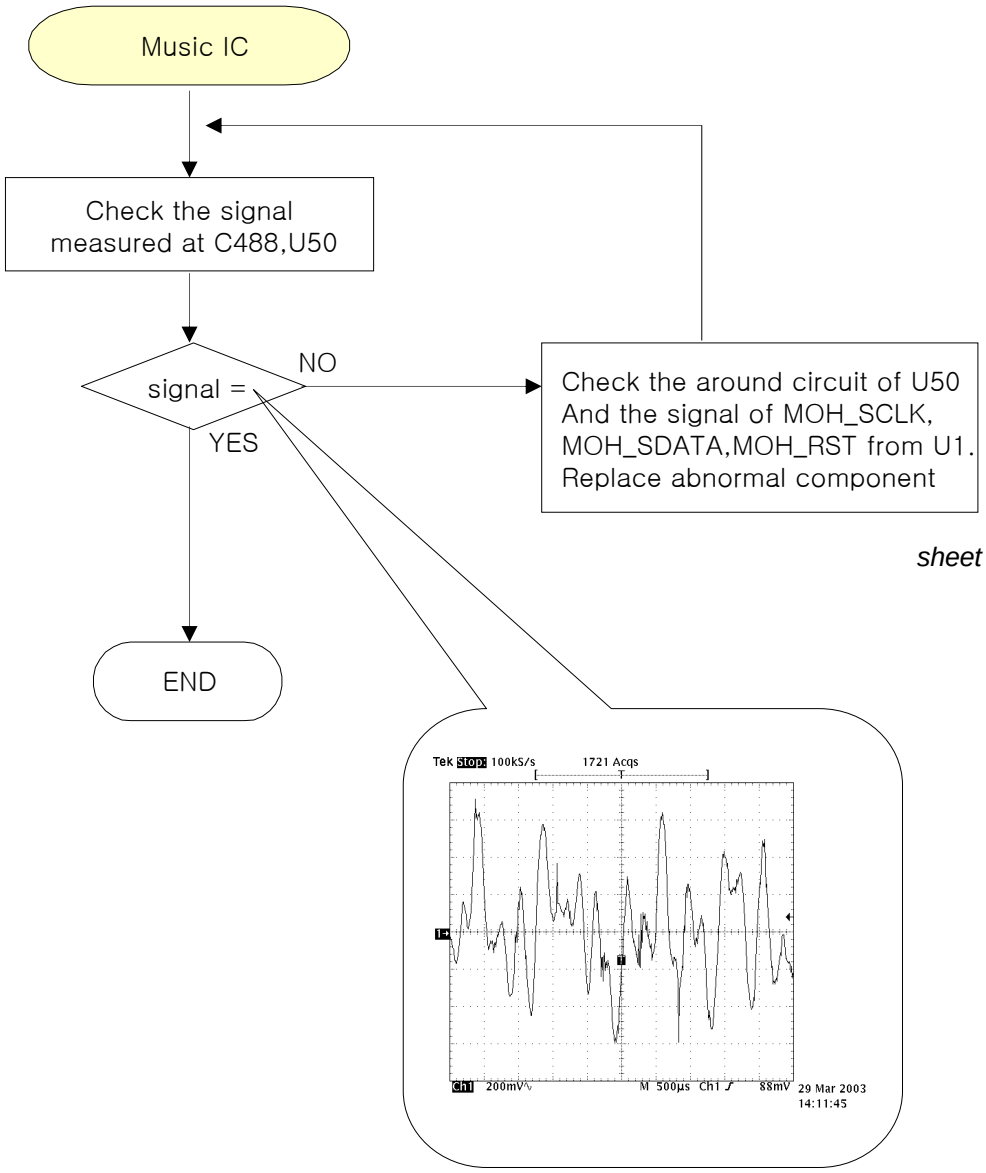
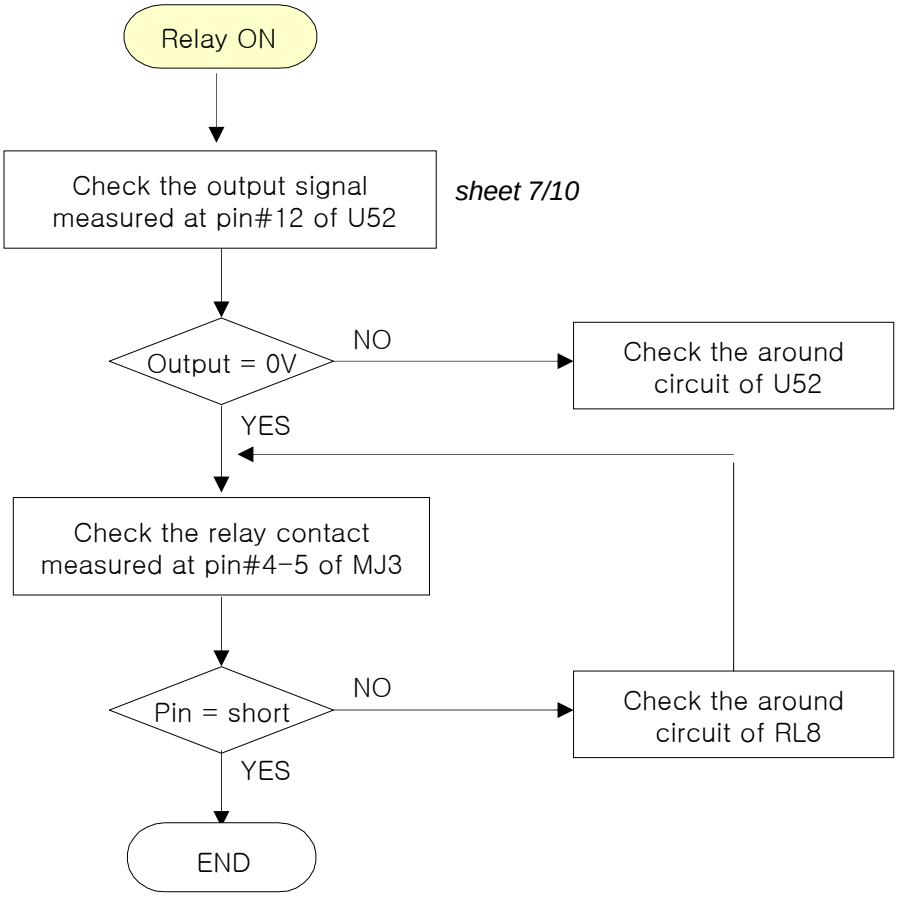


sheet 1,5/10

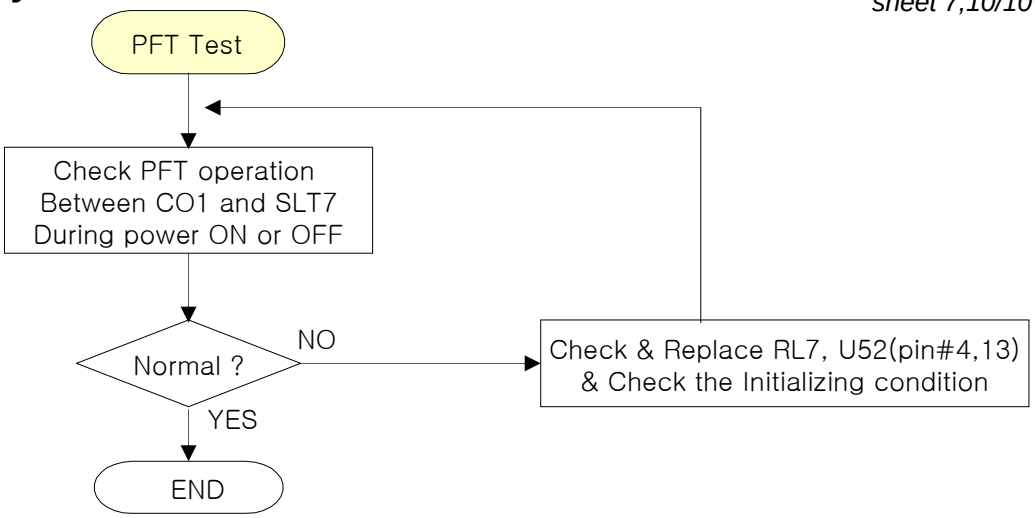
1.12 General Purpose Relay circuit

sheet 10/10



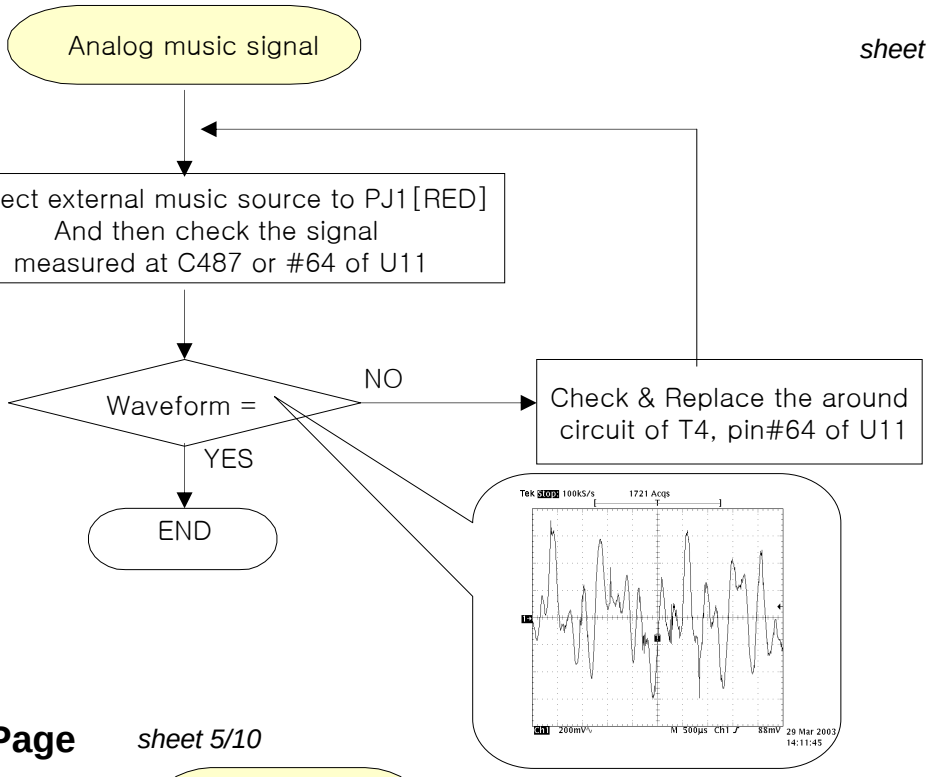
1.13 PFT Relay circuit

sheet 7,10/10



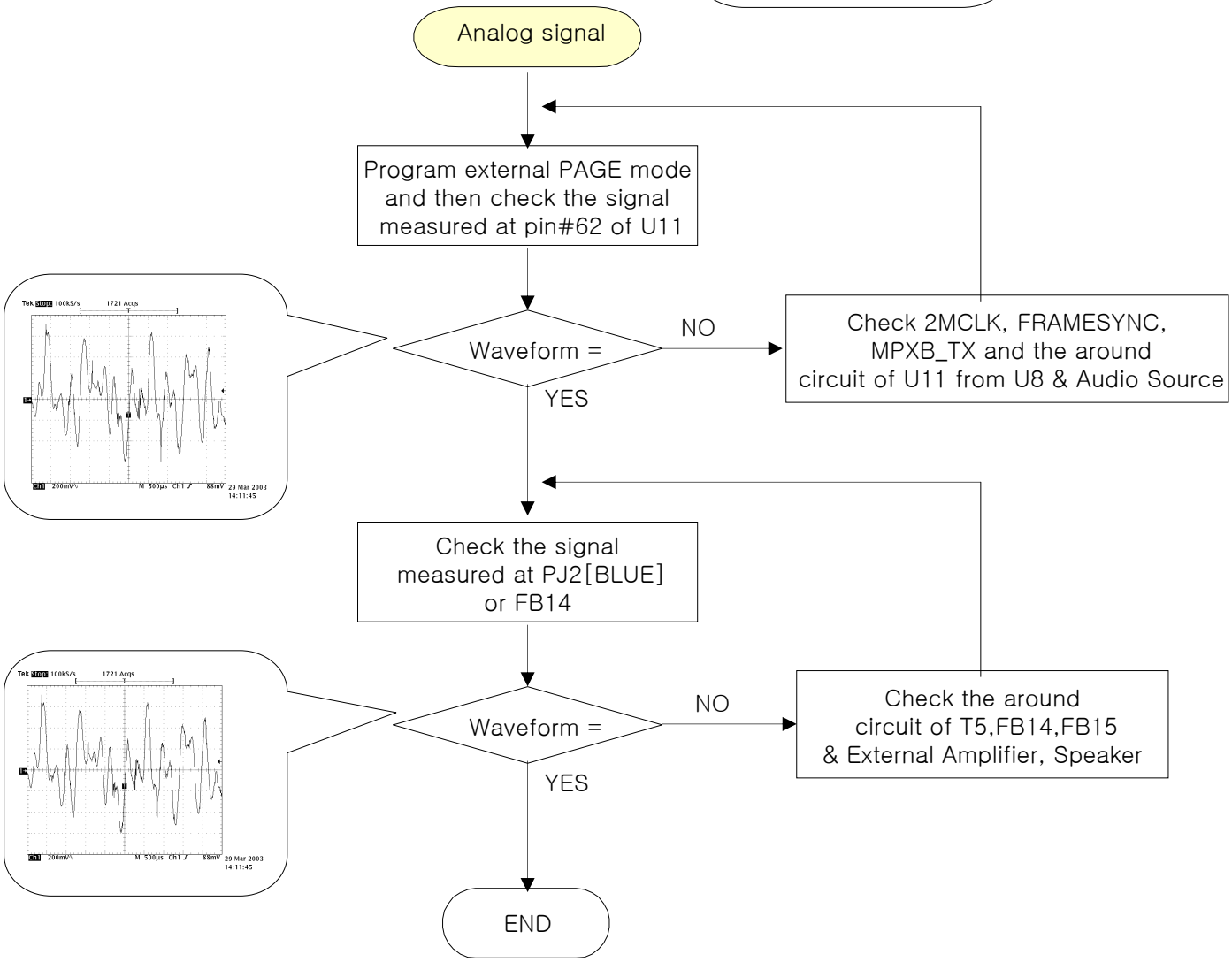
1.14 External MOH

sheet 5,7/10

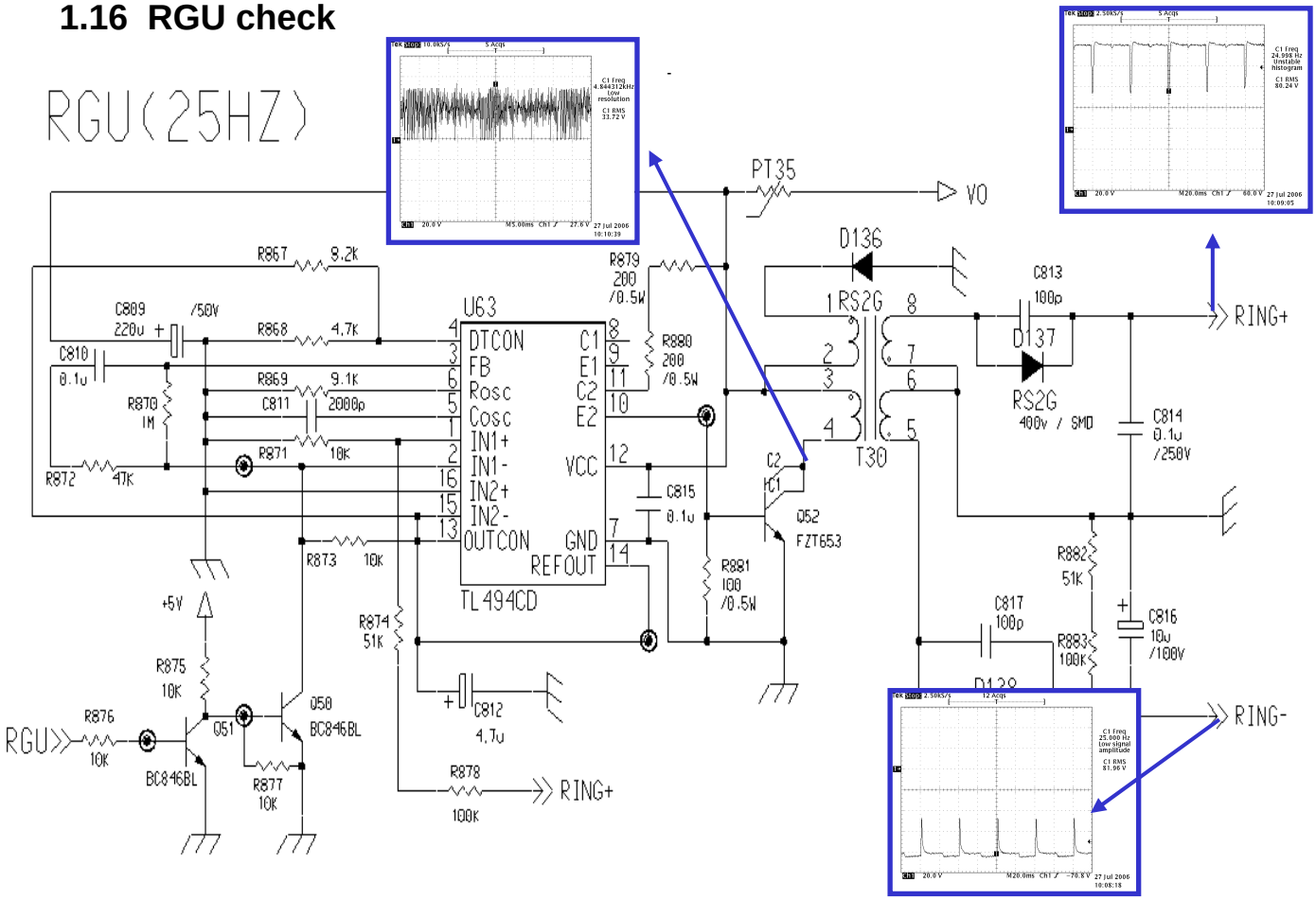


1.15 External Page

sheet 5/10

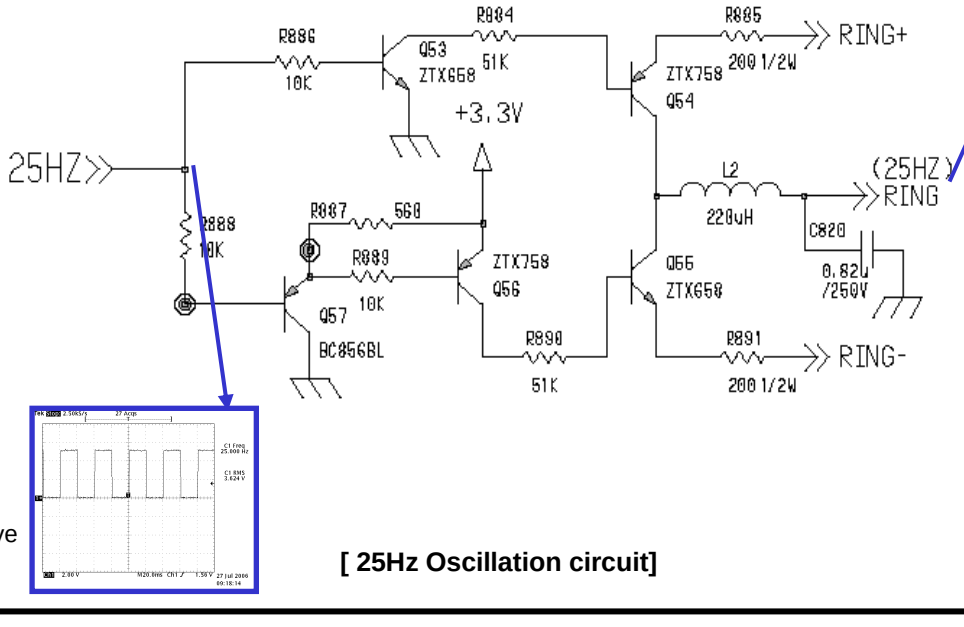


1.16 RGU check



※ Note : RGU operates just in SLT ringing state, it doesn't work during SLT idle state.
- Ringing state : 25Hz square wave
- idle state : no output

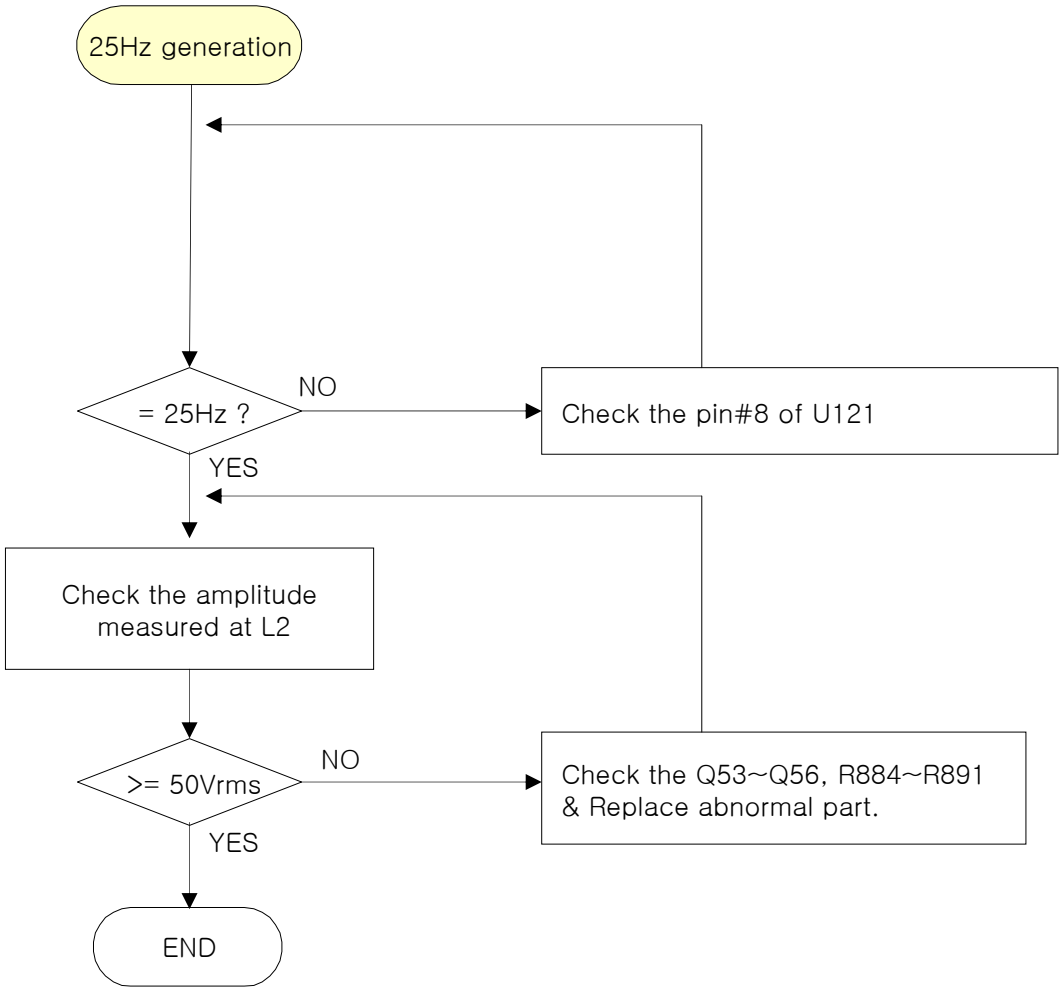
[Ring Generation Unit circuit]



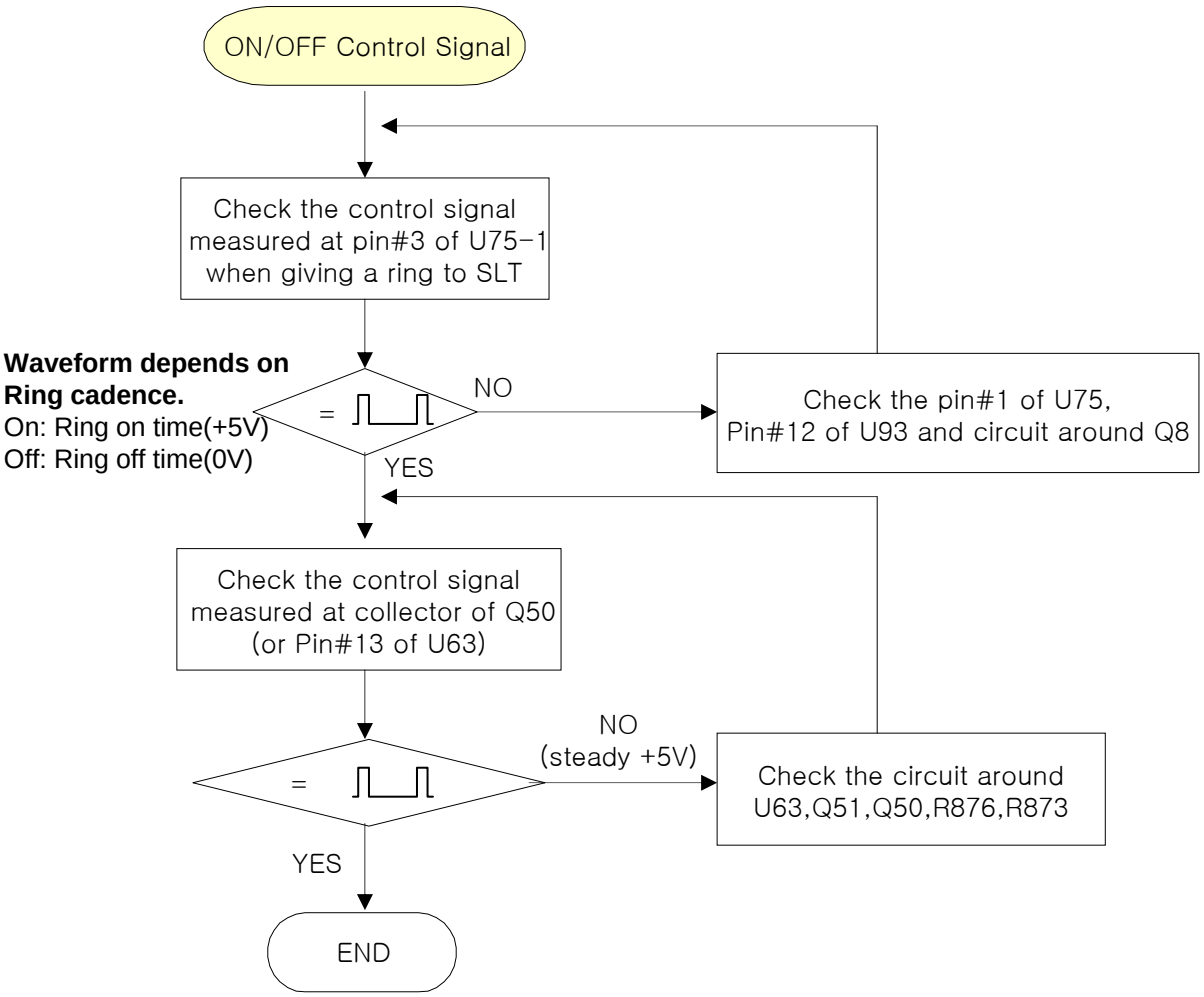
25Hz square wave

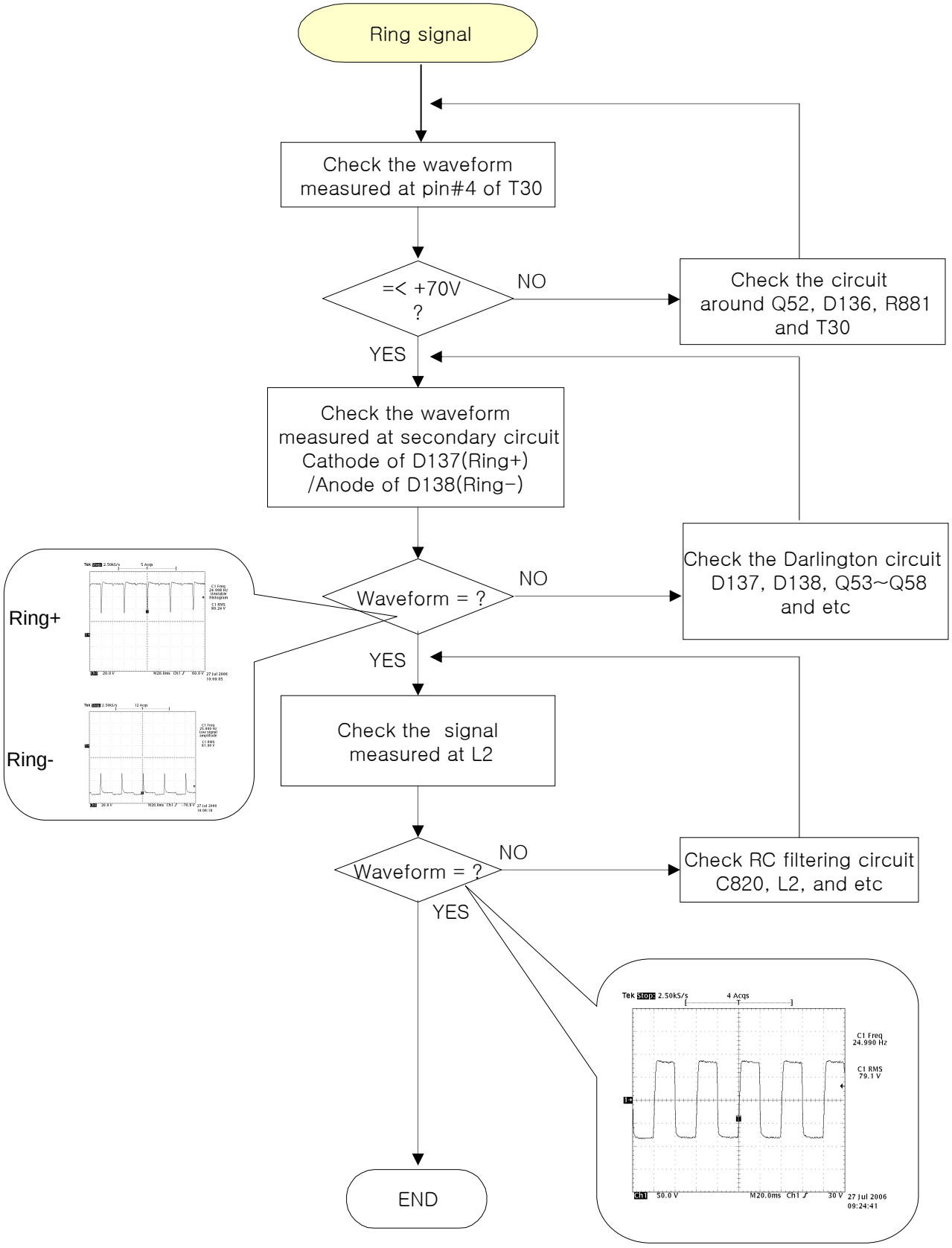
[25Hz Oscillation circuit]

1) 25Hz generation circuit



2) Ring signal generation circuit

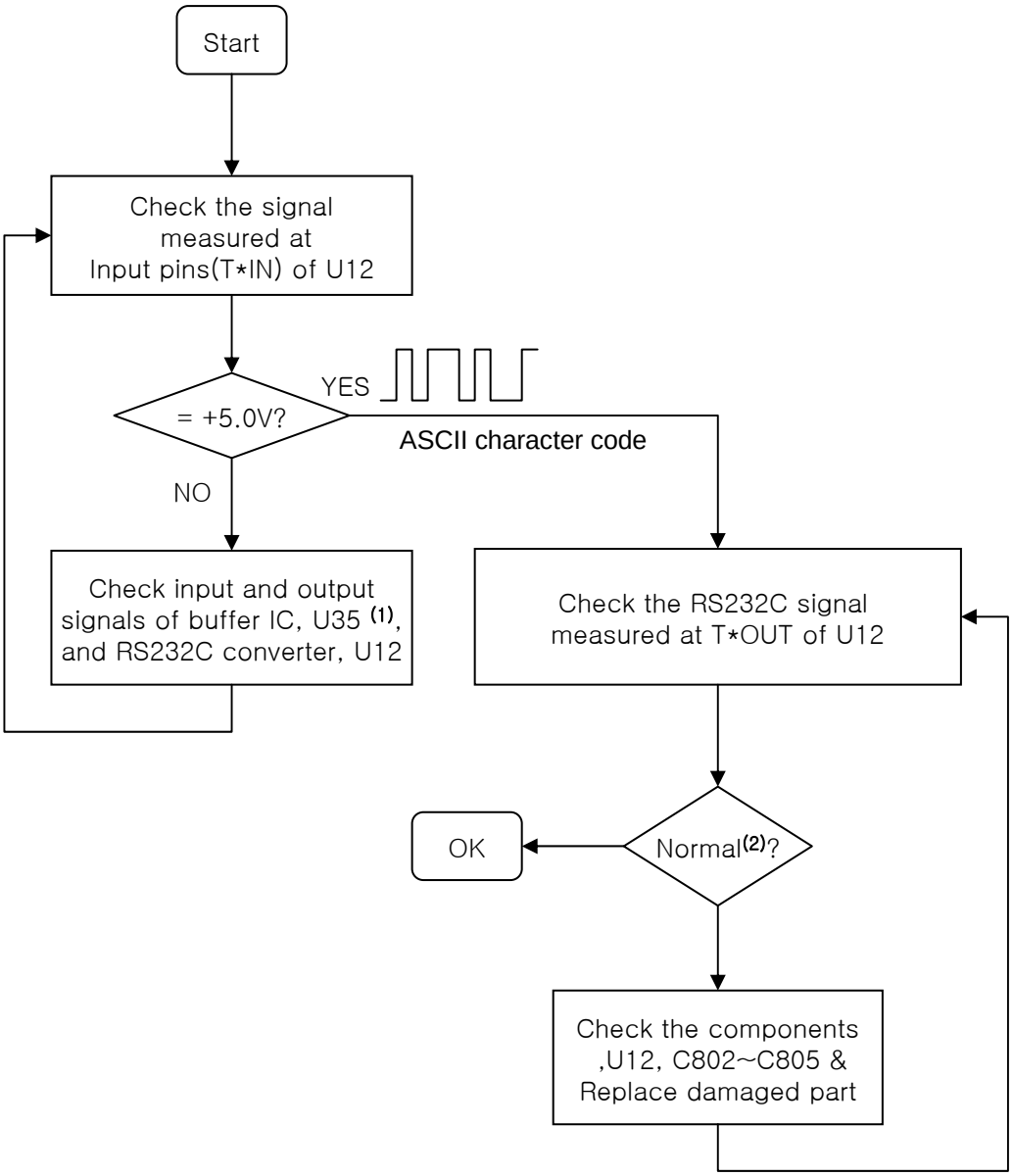




Ring signal: 25Hz, >50Vrms

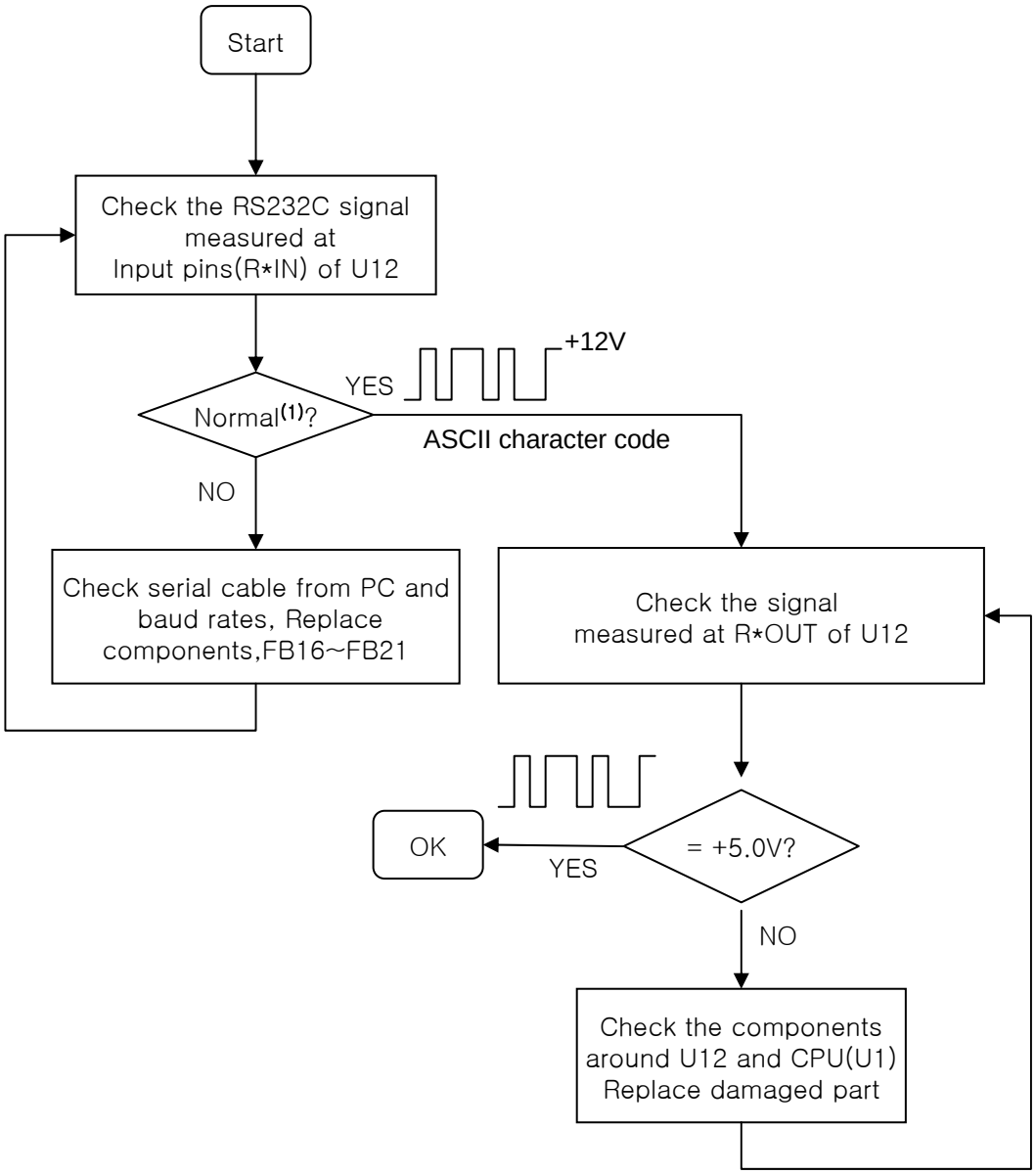
1.17 Serial(RS-232C) Port check

1) Transmitting side(System TX, PC RX)



※ Note
(1) Buffer IC,U35, converts +3.3V signal from CPU to +5.0V signal.
(2) A standard serial interfacing for PC, RS232C, requires negative logic, i.e., logic '1' is −3V to −12V and logic '0' is +3V to +12V.

2) Receiving side(PC TX, System RX)

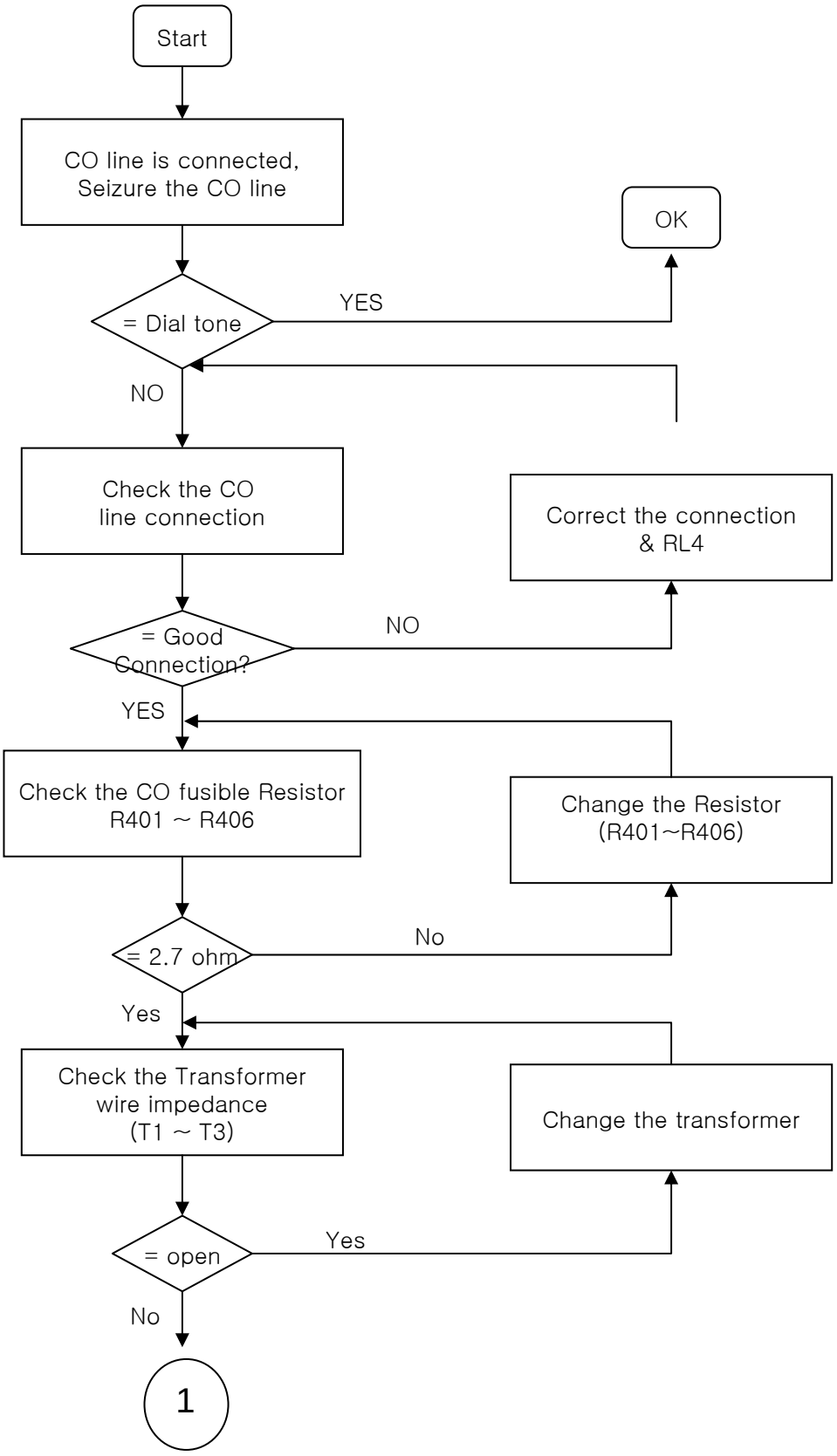


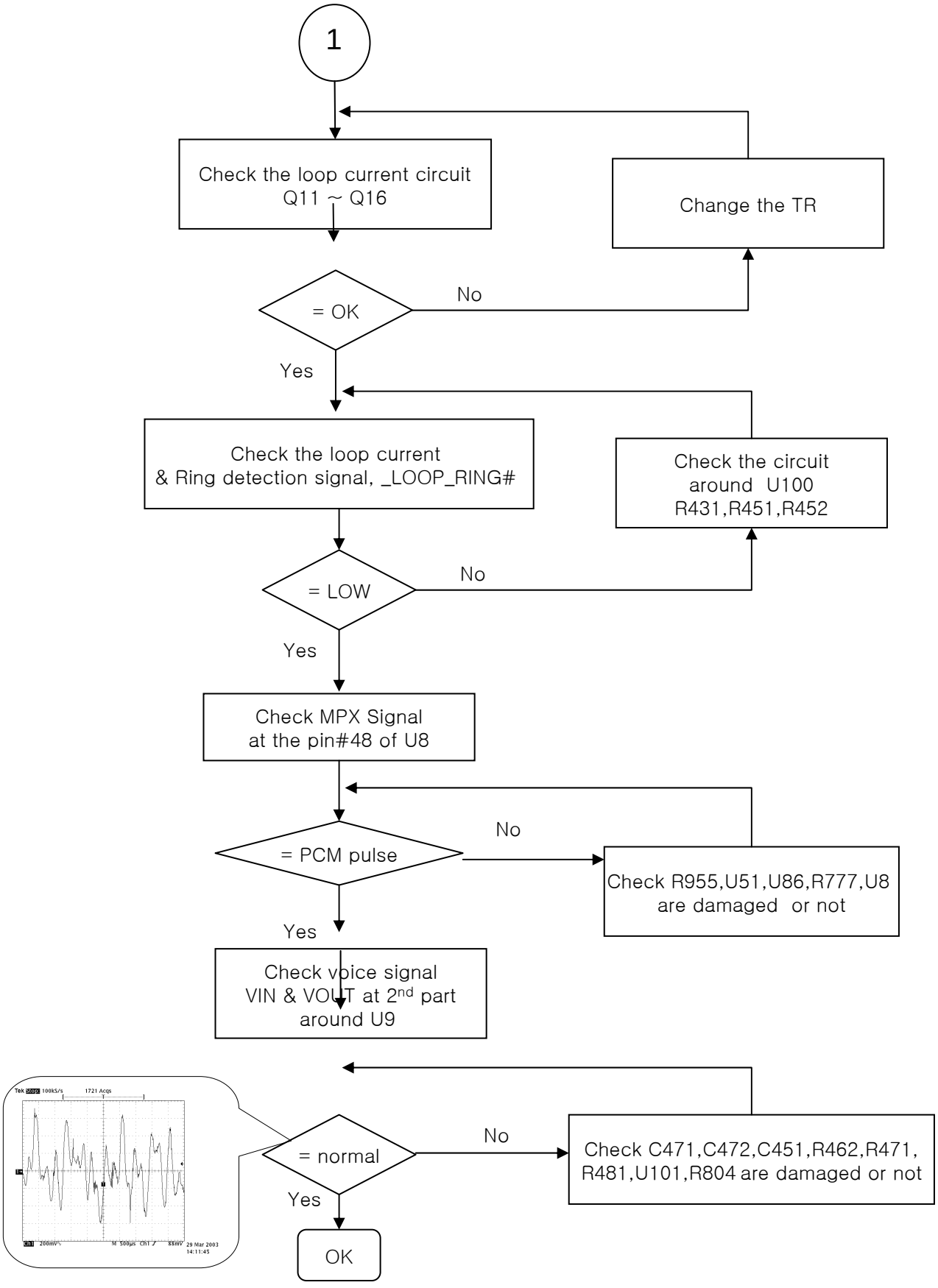
※ Note
(1) A standard serial interfacing for PC, RS232C, requires negative logic, i.e., logic '1' is −3V to −12V and logic '0' is +3V to +12V

1.18 CO interface circuit

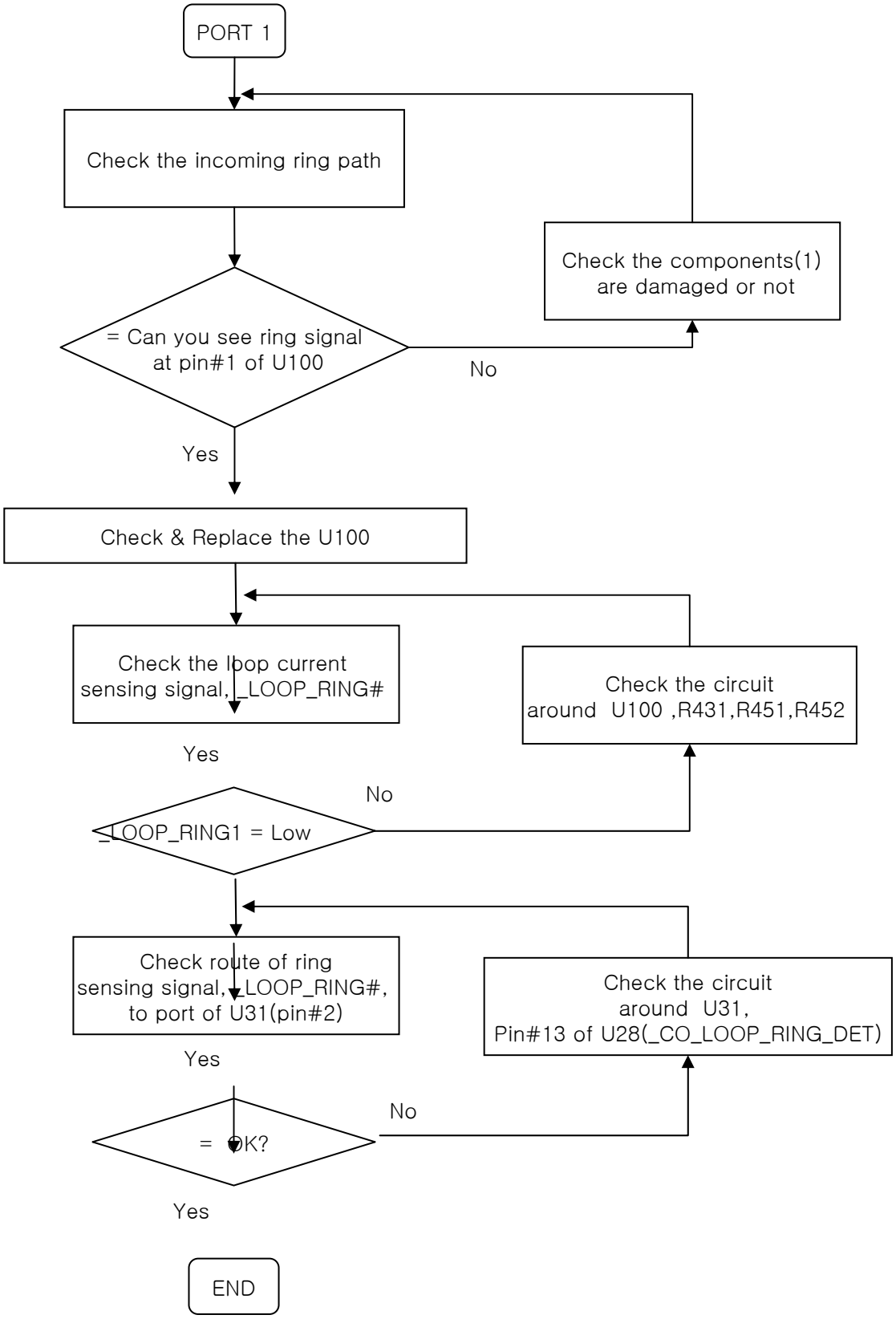
sheet 5/10

1) CO Dial tone check(1'st Port)




1
Check the loop current circuit
Q11 ~ Q16
Change the TR
= OK
No
Yes
Check the loop current
& Ring detection signal, _LOOP_RING#
Check the circuit
around U100
R431,R451,R452
= LOW
No
Yes
Check MPX Signal
at the pin#48 of U8
= PCM pulse
No
Check R955,U51,U86,R777,U8
are damaged or not
Yes
Check voice signal
VIN & VOUT at 2nd part
around U9
= normal
No
Check C471,C472,C451,R462,R471,
R481,U101,R804 are damaged or not
Yes
OK

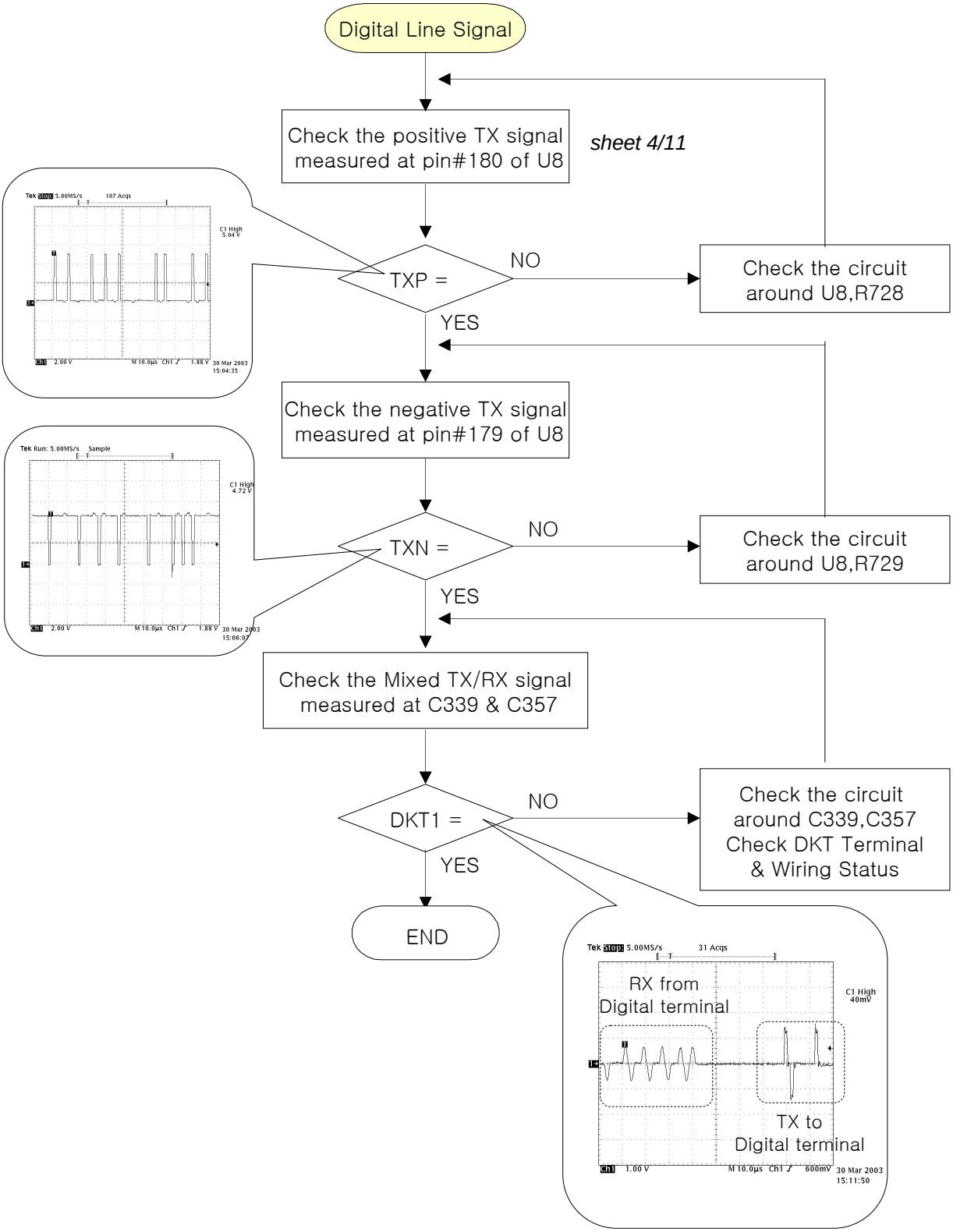
2) CO Ring detection check(1st Port)



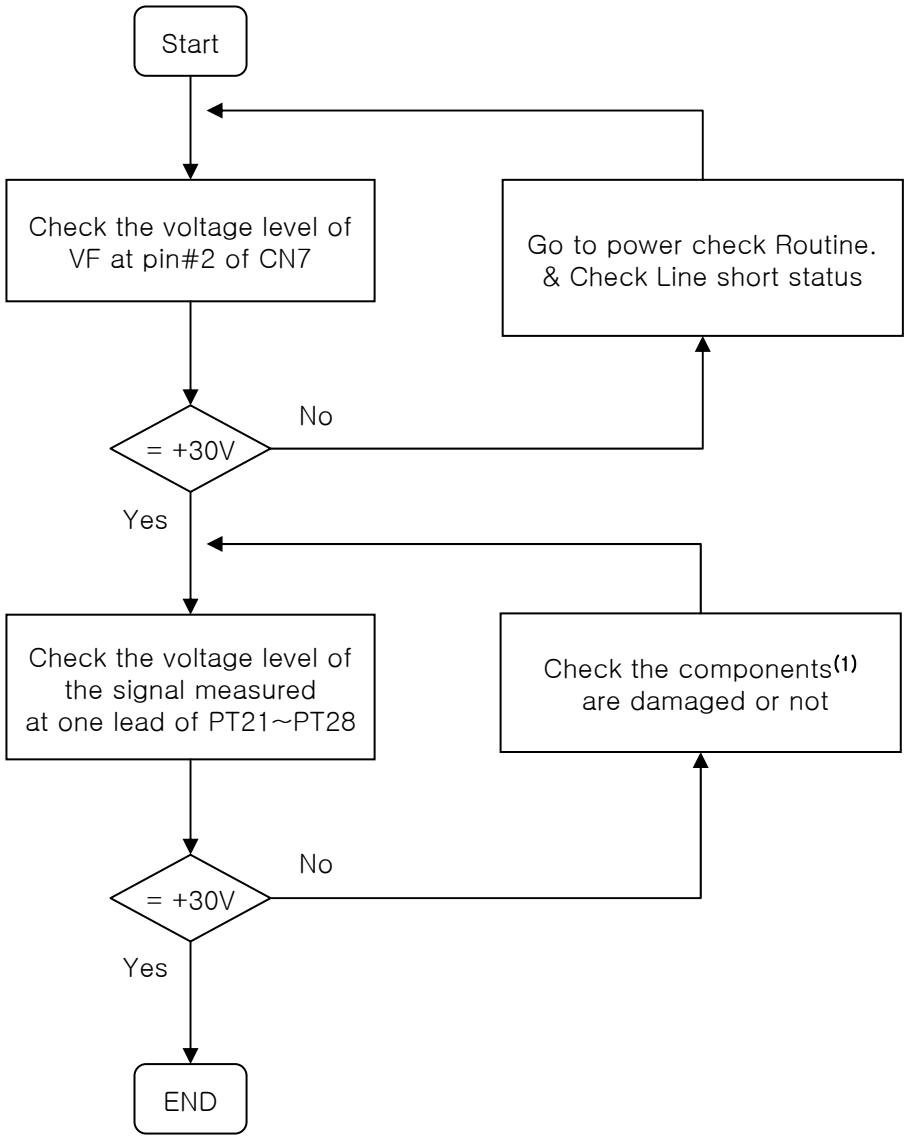
※ Note
(1) C401, R401,R402, RL4, R411, ZD11, ZD12, BD1, Q11, Q12, R421,R422,R431

1.19 Digital Terminal Interface(1st port) *sheet 8/10*

1) AMI signaling check



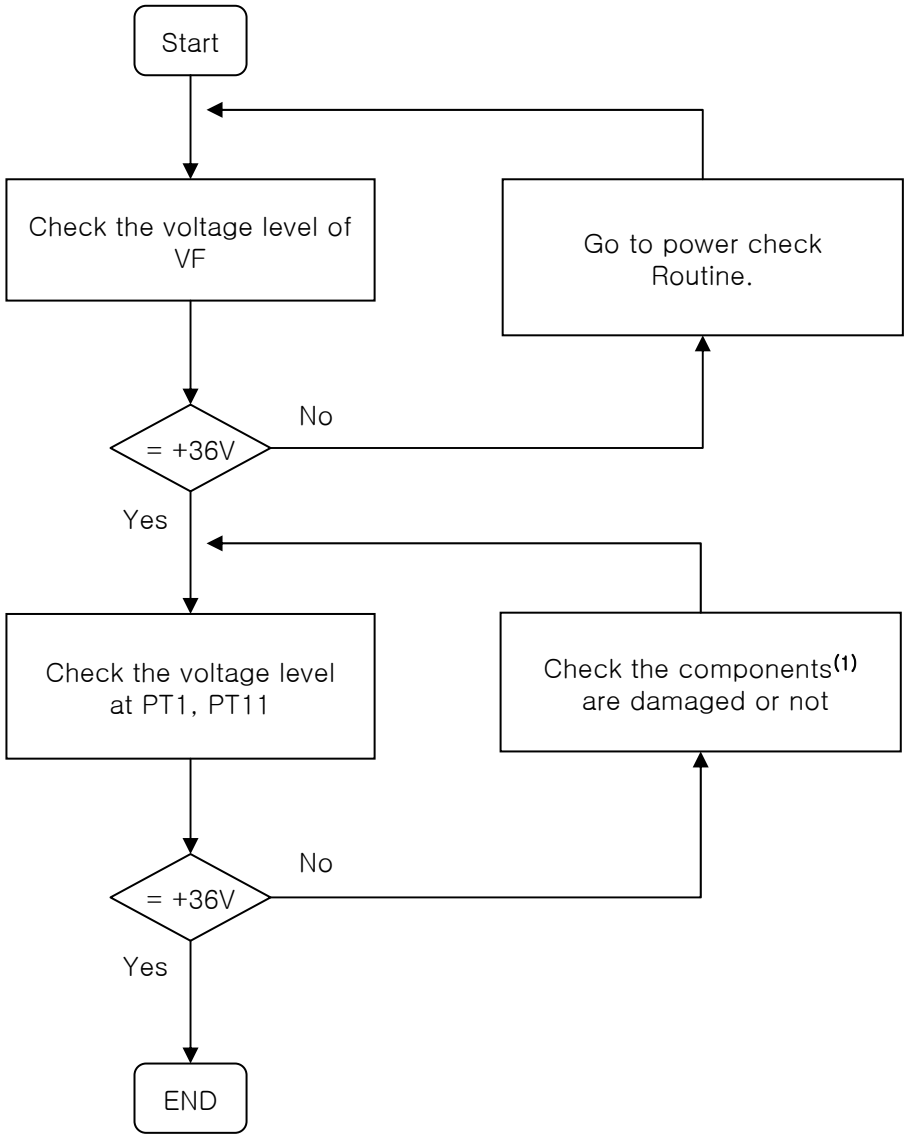
2) DKT interface Line feeding voltage(+30V) check



※ Note
(1) PT21, T21, C741, C751, C761

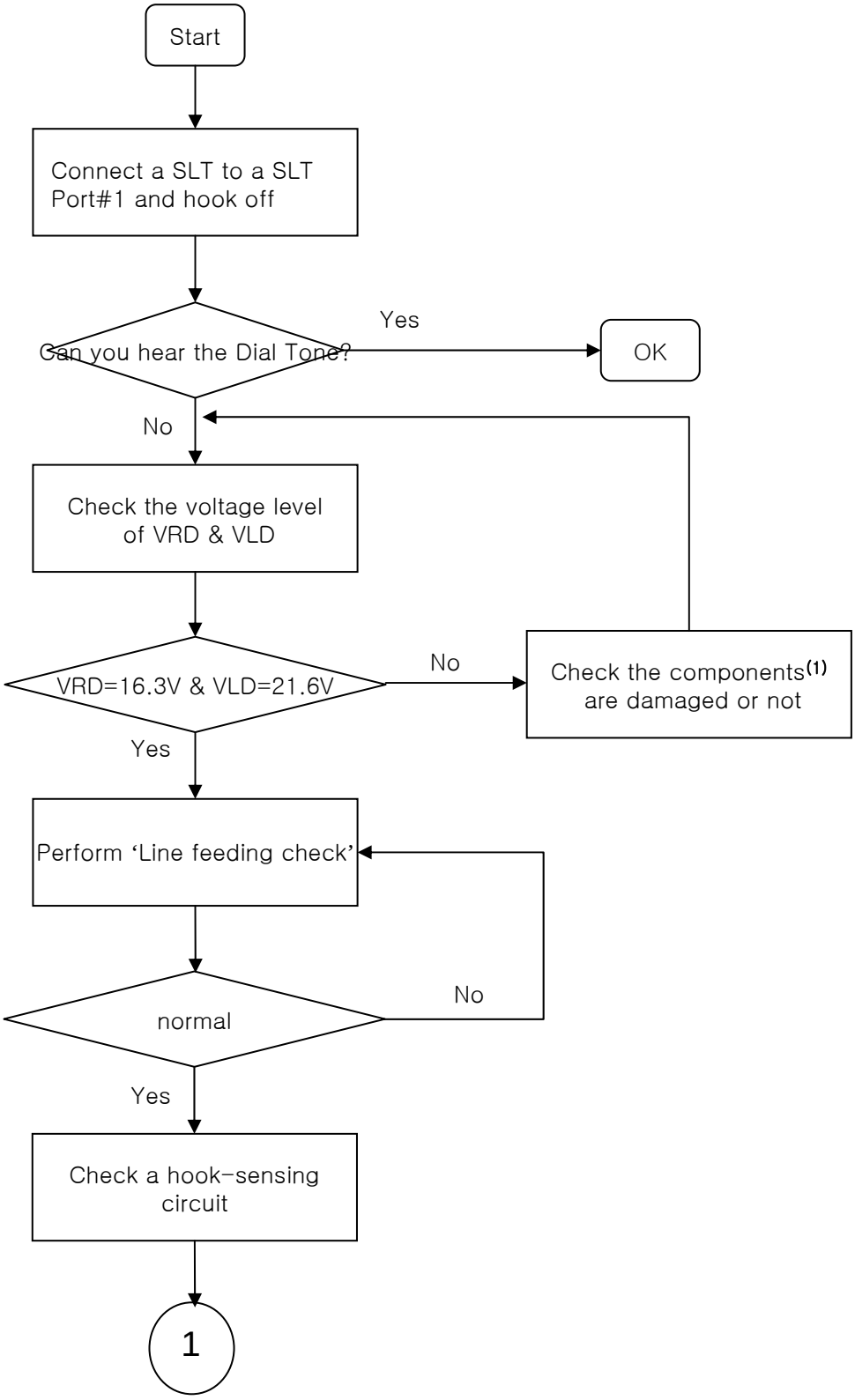
1.20 SLT interface circuit(1st port) *sheet 6,7/10*

1) Line feeding voltage(+36V) check *sheet 6/11*

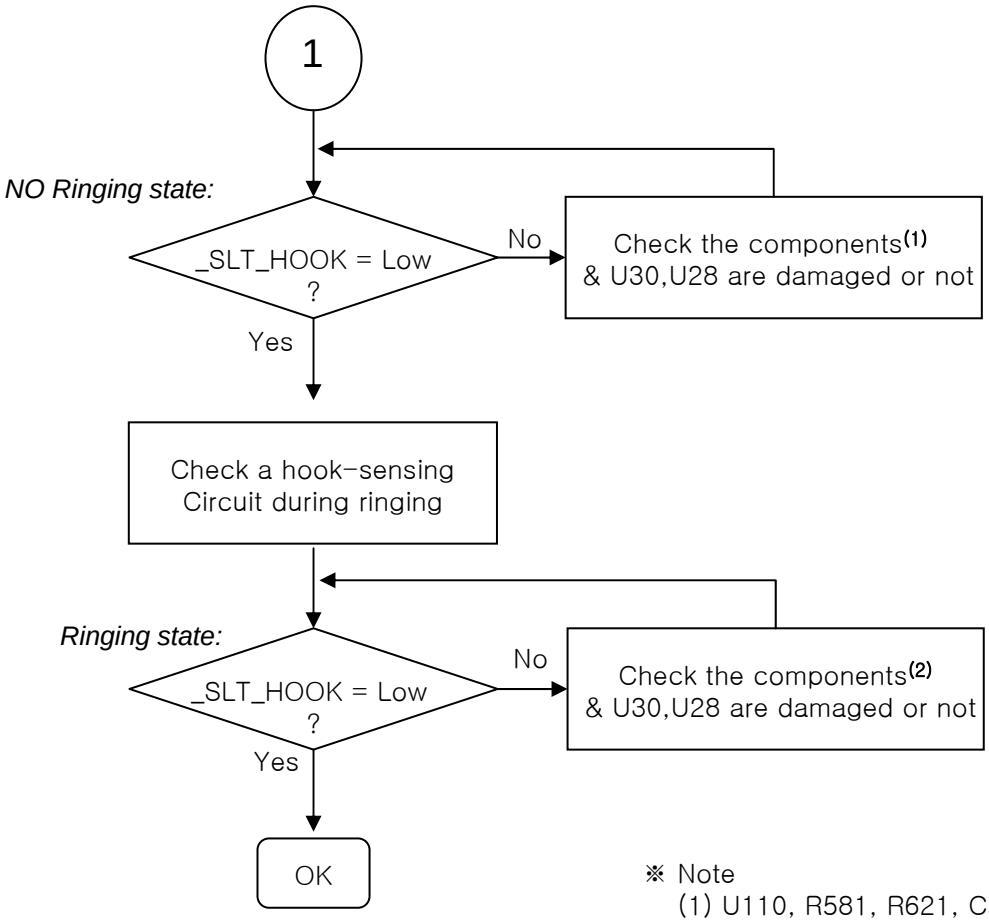


※ Note
(1) Q21, R541, R551, R561, Q31, R601, R611, R631, RL11, R501, R511

2) Hook-sensing check *sheet 6,7/10*

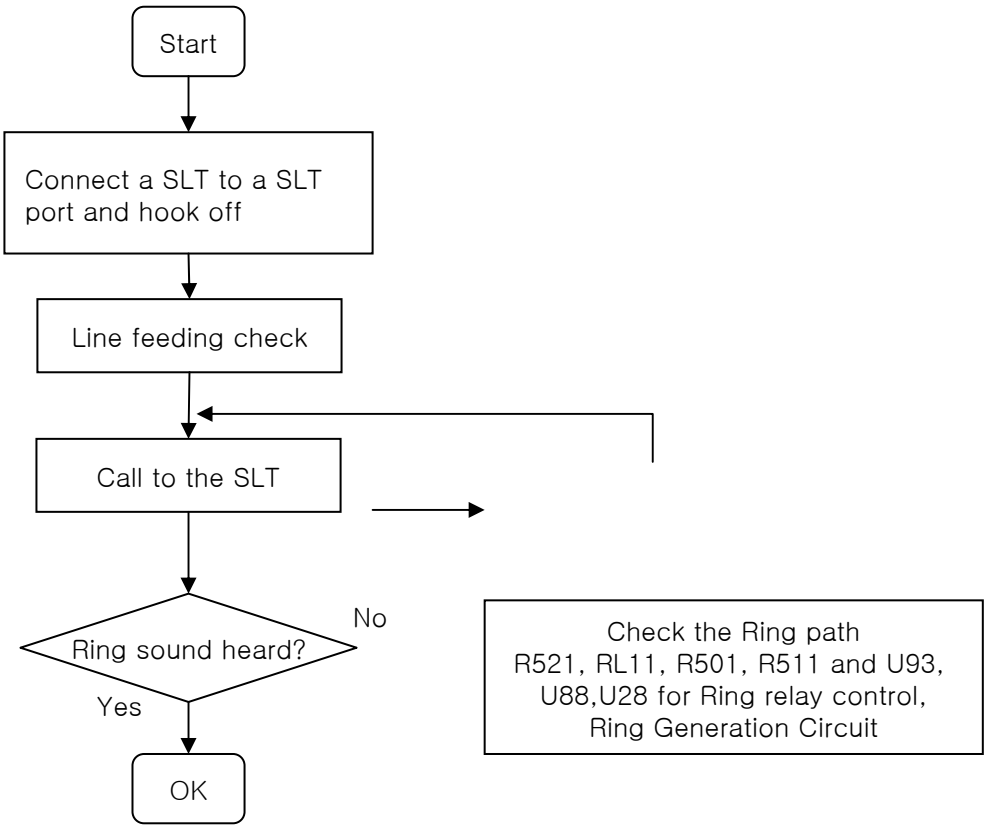


※ Note
(1) U110, U104, R581, R621, R591, C551, R951~R954

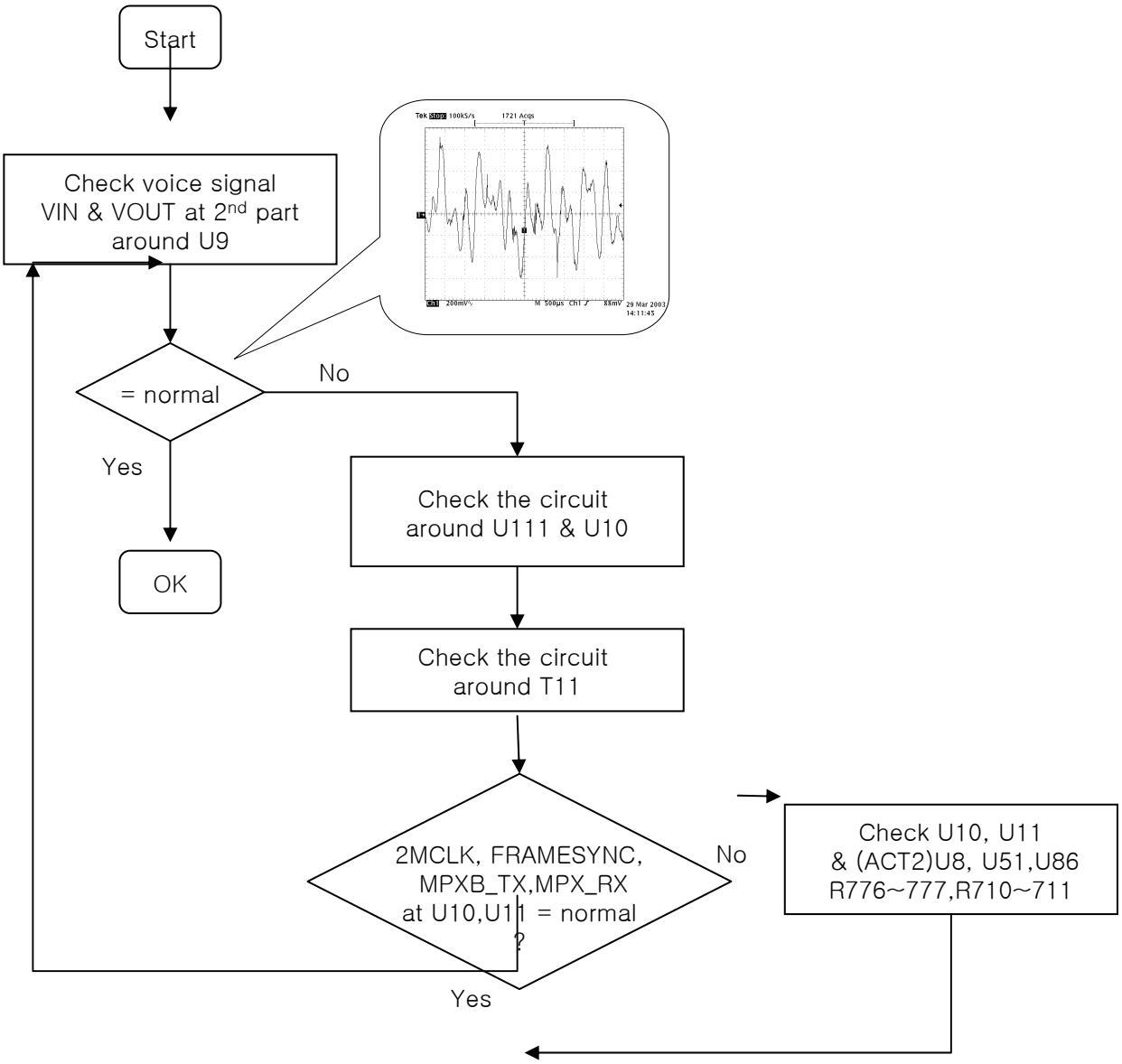


※ Note
(1) U110, R581, R621, C551, R591
(2) U104, R521, R531, C521, D21, ZD31

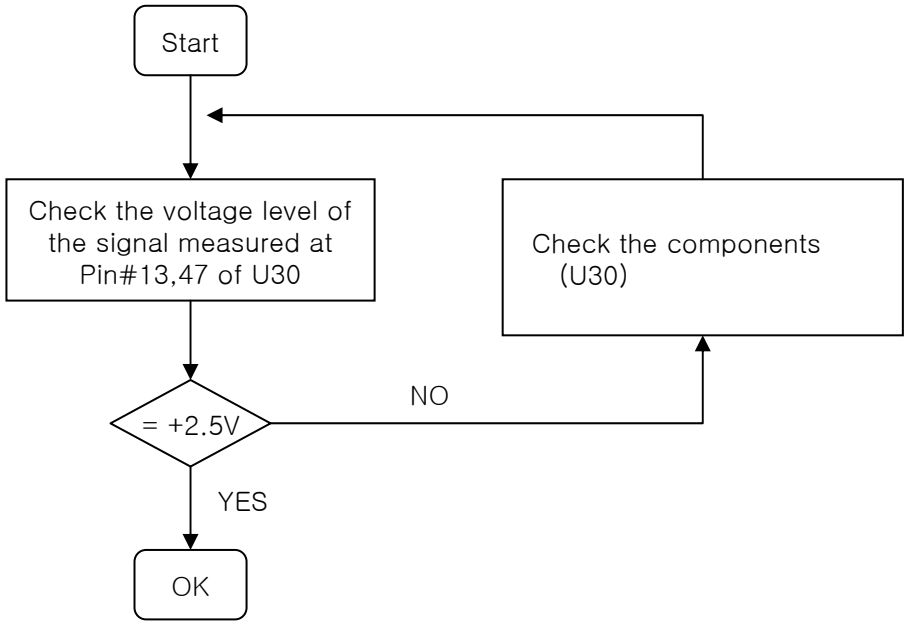
3) SLT Ring path check



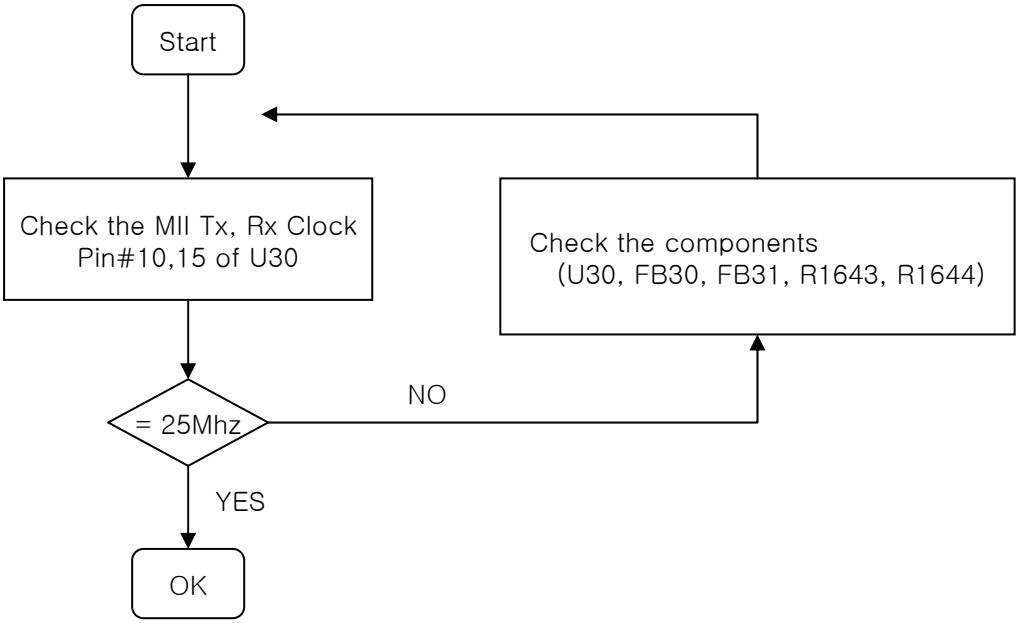
4) SLT Voice path check



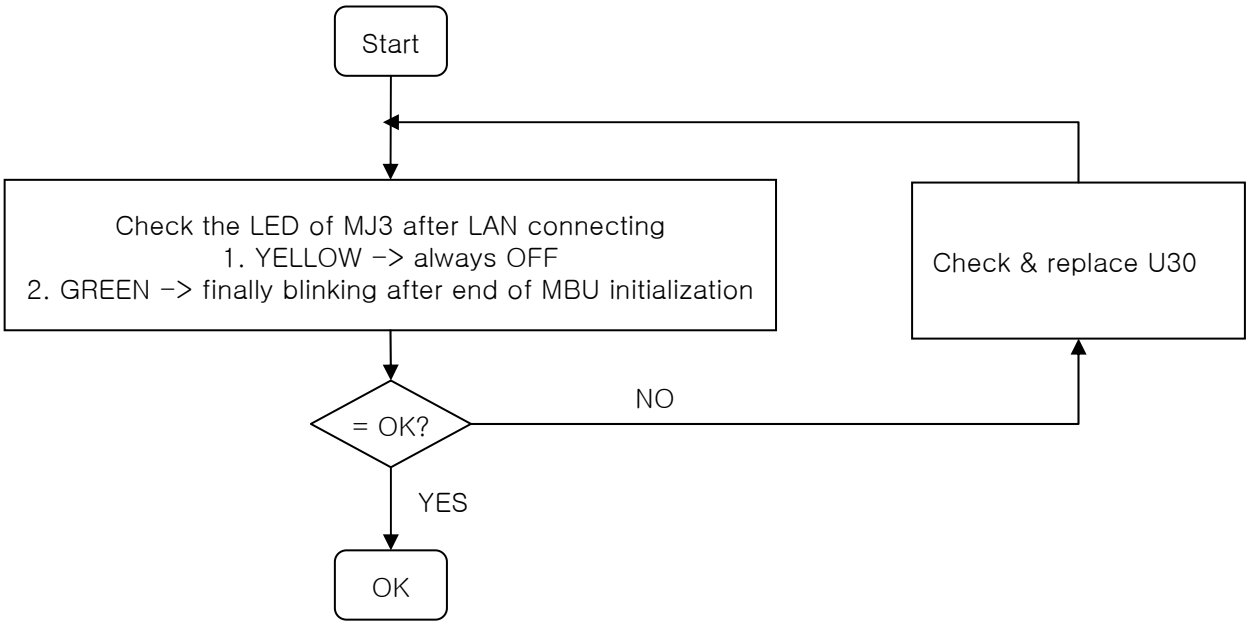
1.21 +2.5V Voltage generation check



1.22 MII Clock(25Mhz) generation Check

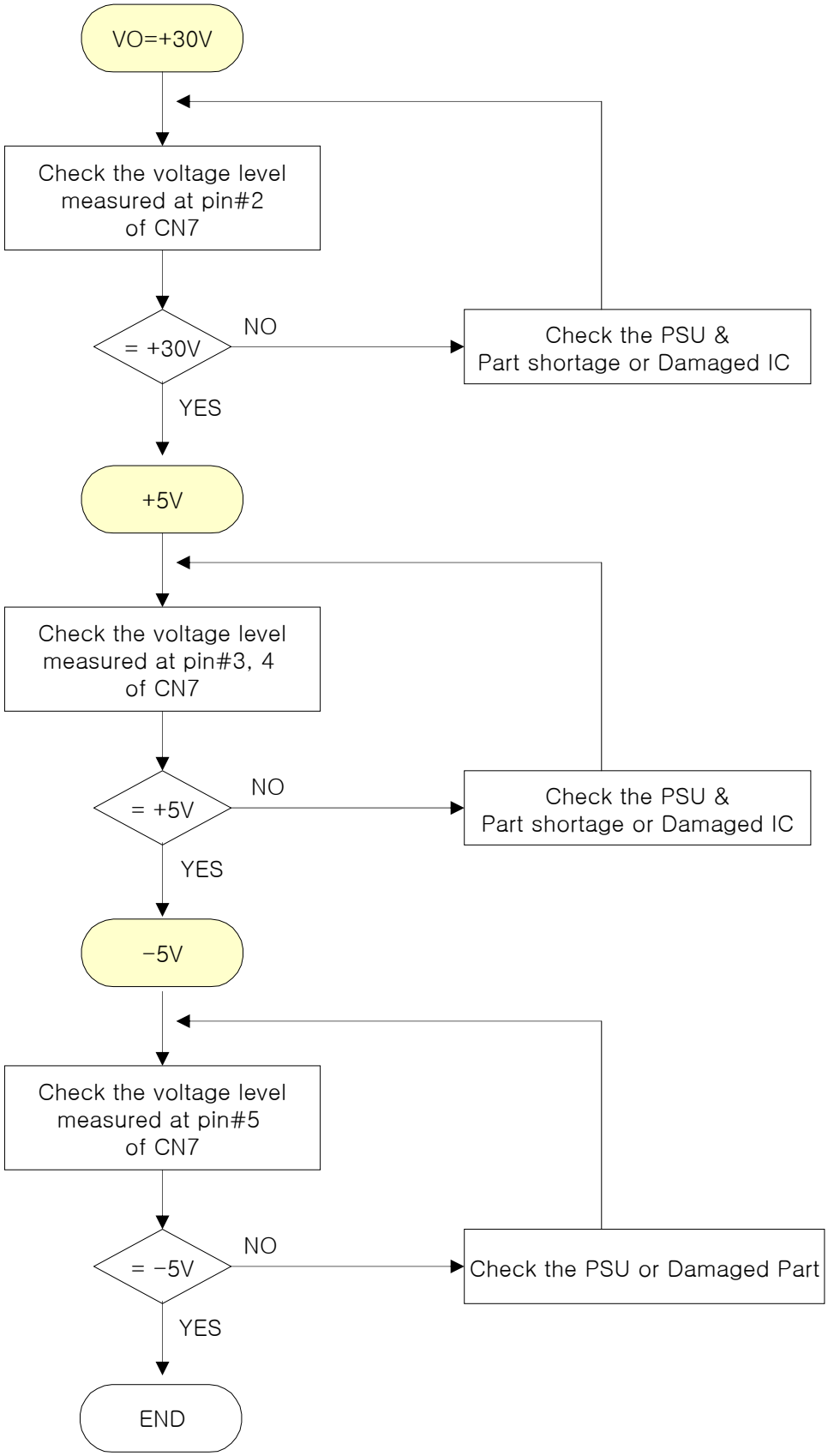


1.23 Component check

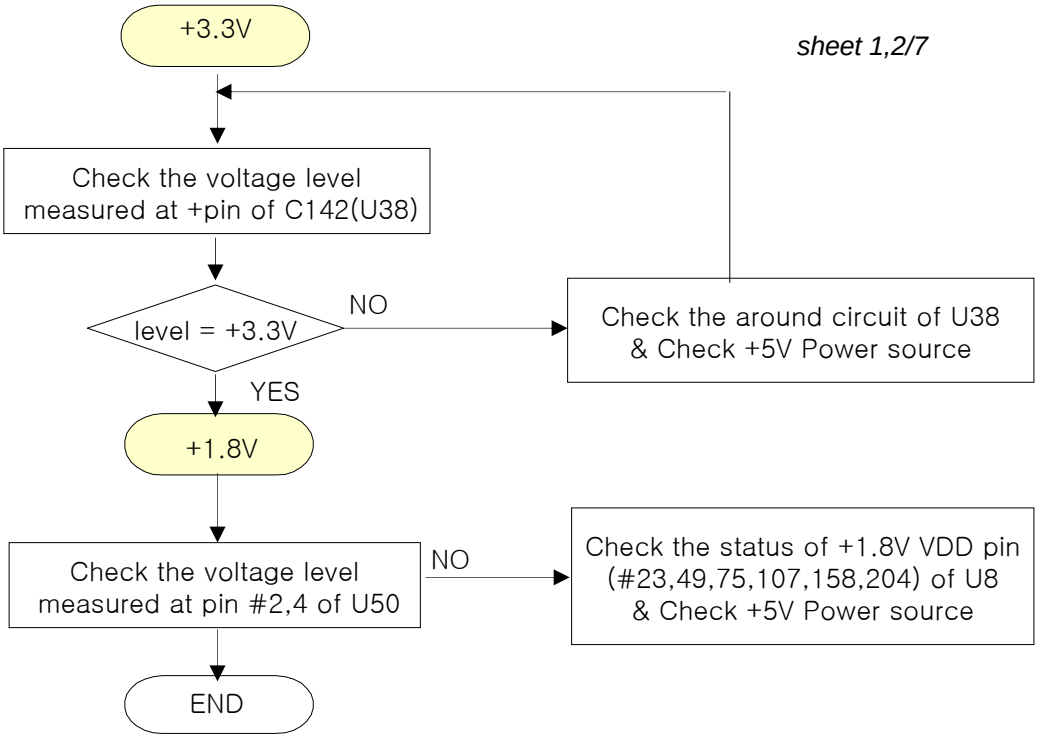


2. EMBU

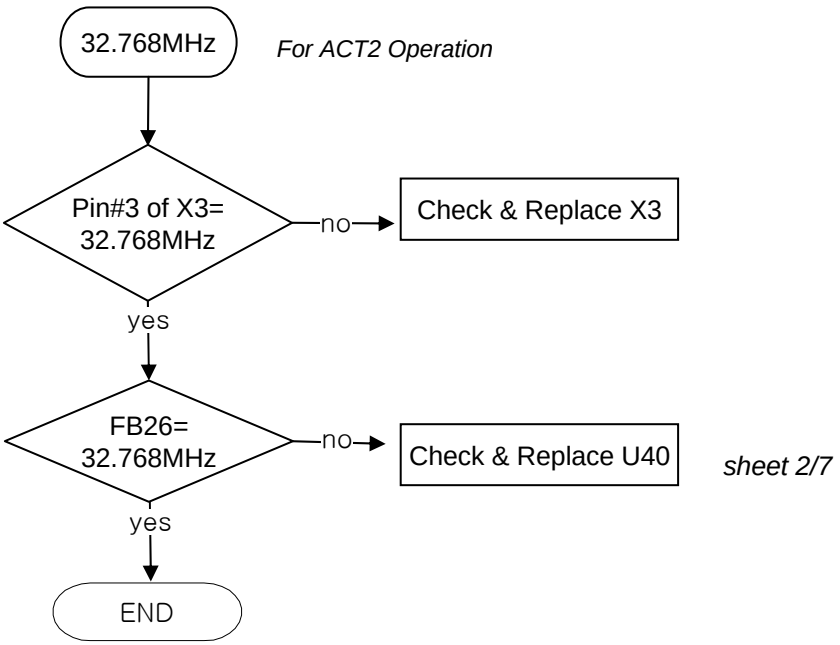
2.1 Power check from PSU (VO = +30V, +5V, -5V)



2.2 +3.3V & +1.8V Power Status

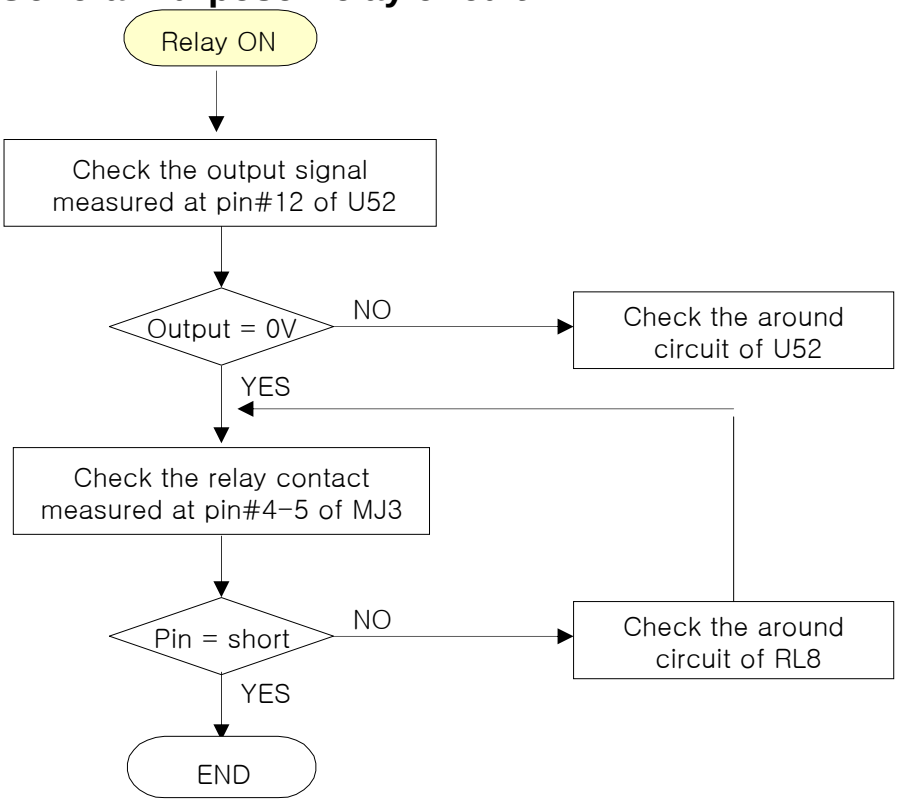


2.3 Clock Check (32.768MHz)



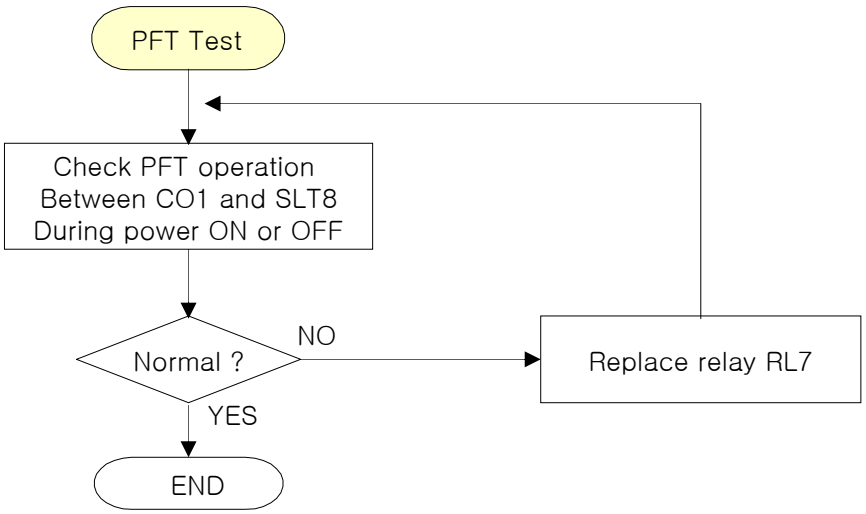
2.4 General Purpose Relay circuit

sheet 7/7



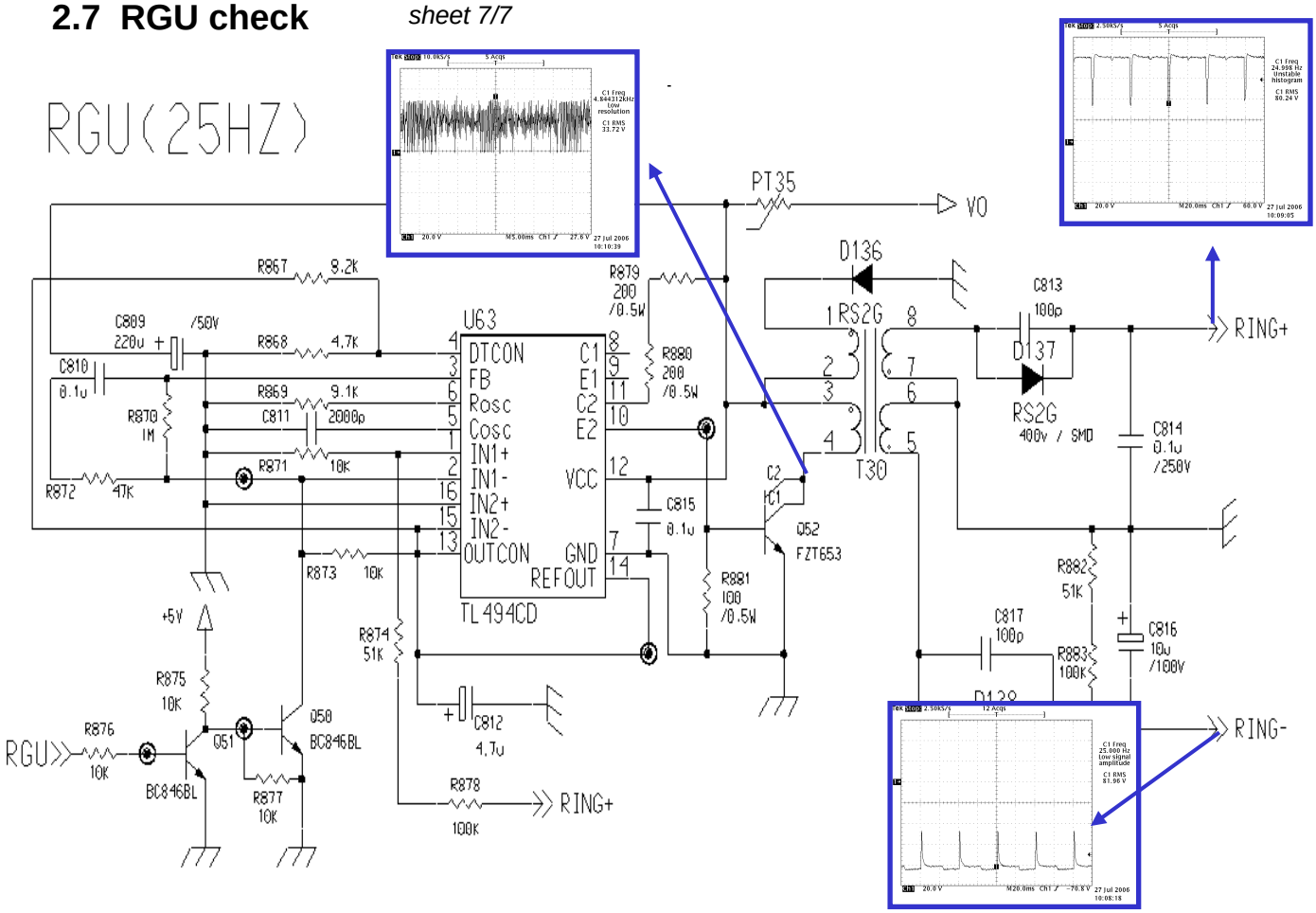
2.5 PFT Relay circuit

sheet 7/7



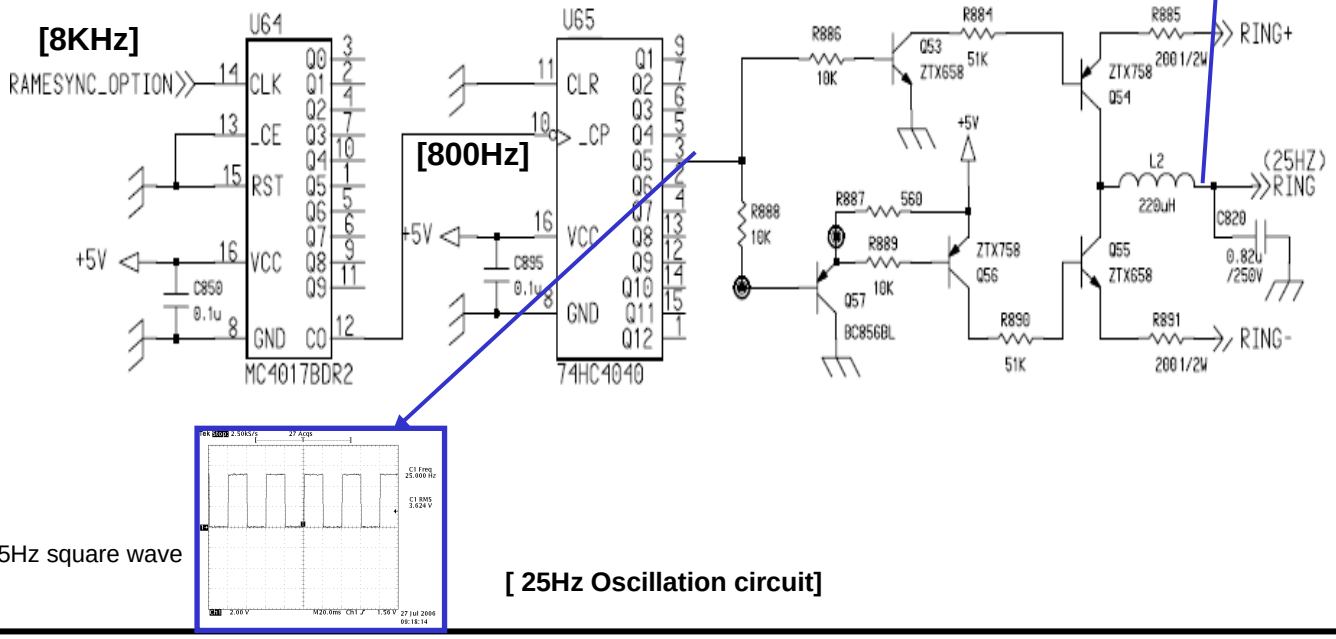
2.7 RGU check

sheet 7/7



※ Note : RGU operates just in SLT ringing state, it doesn't work during SLT idle state.
- Ringing state : 25Hz square wave
- idle state : no output

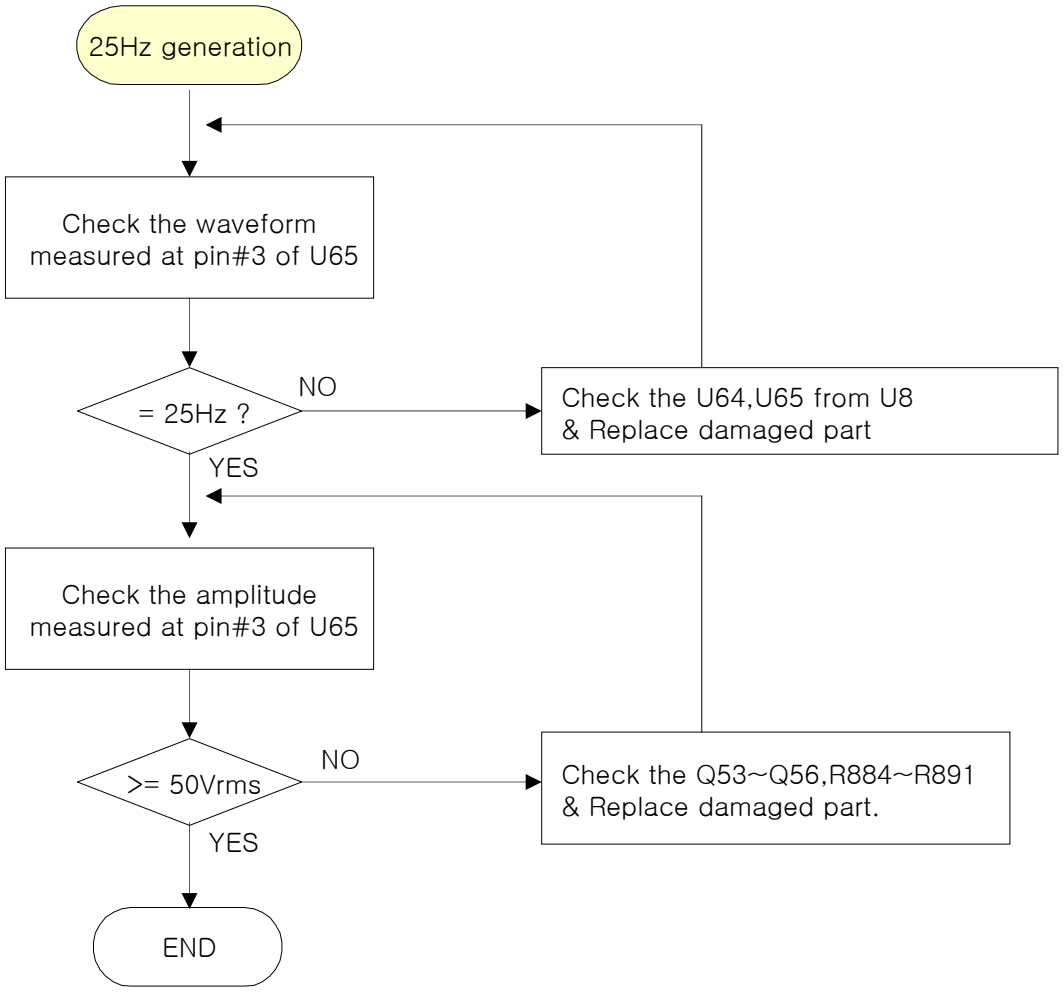
[Ring Generation Unit circuit]



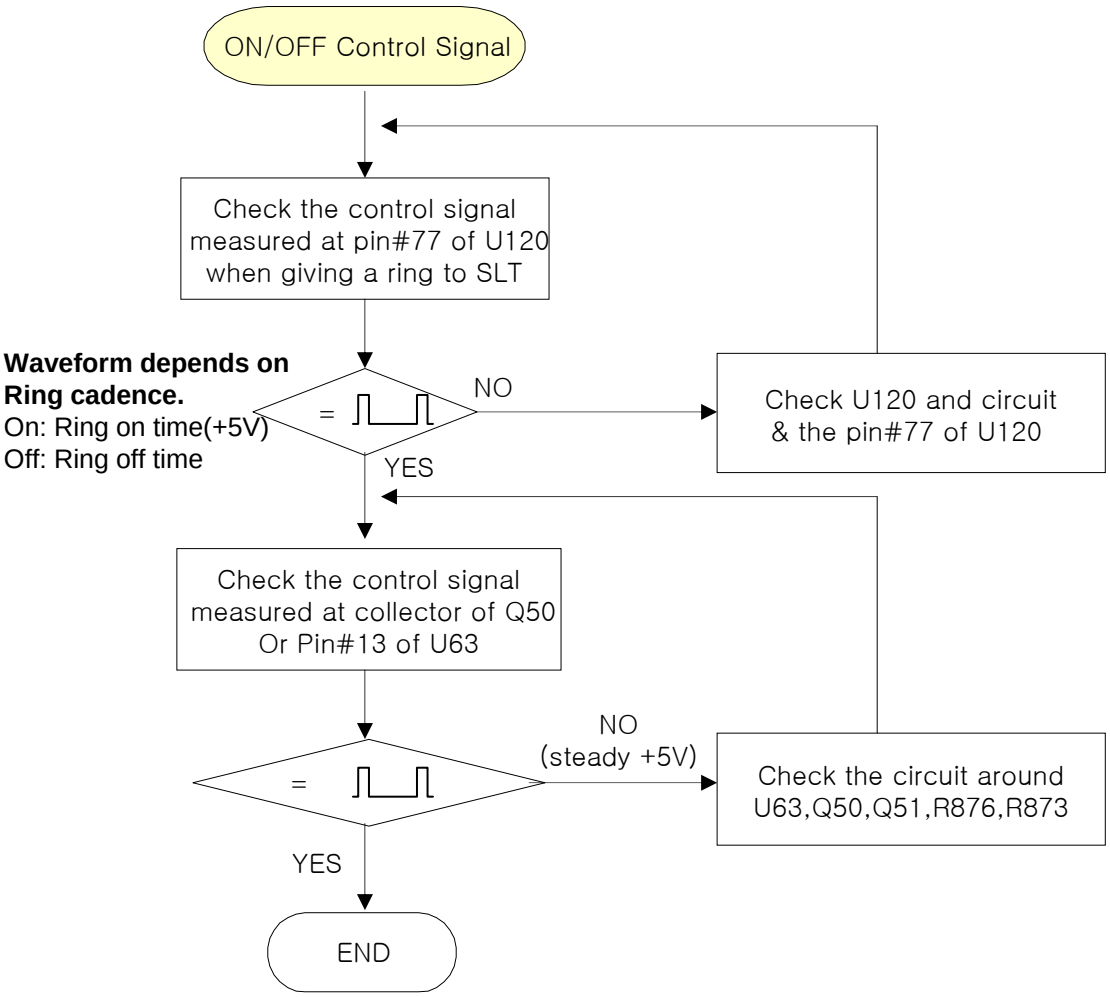
25Hz square wave

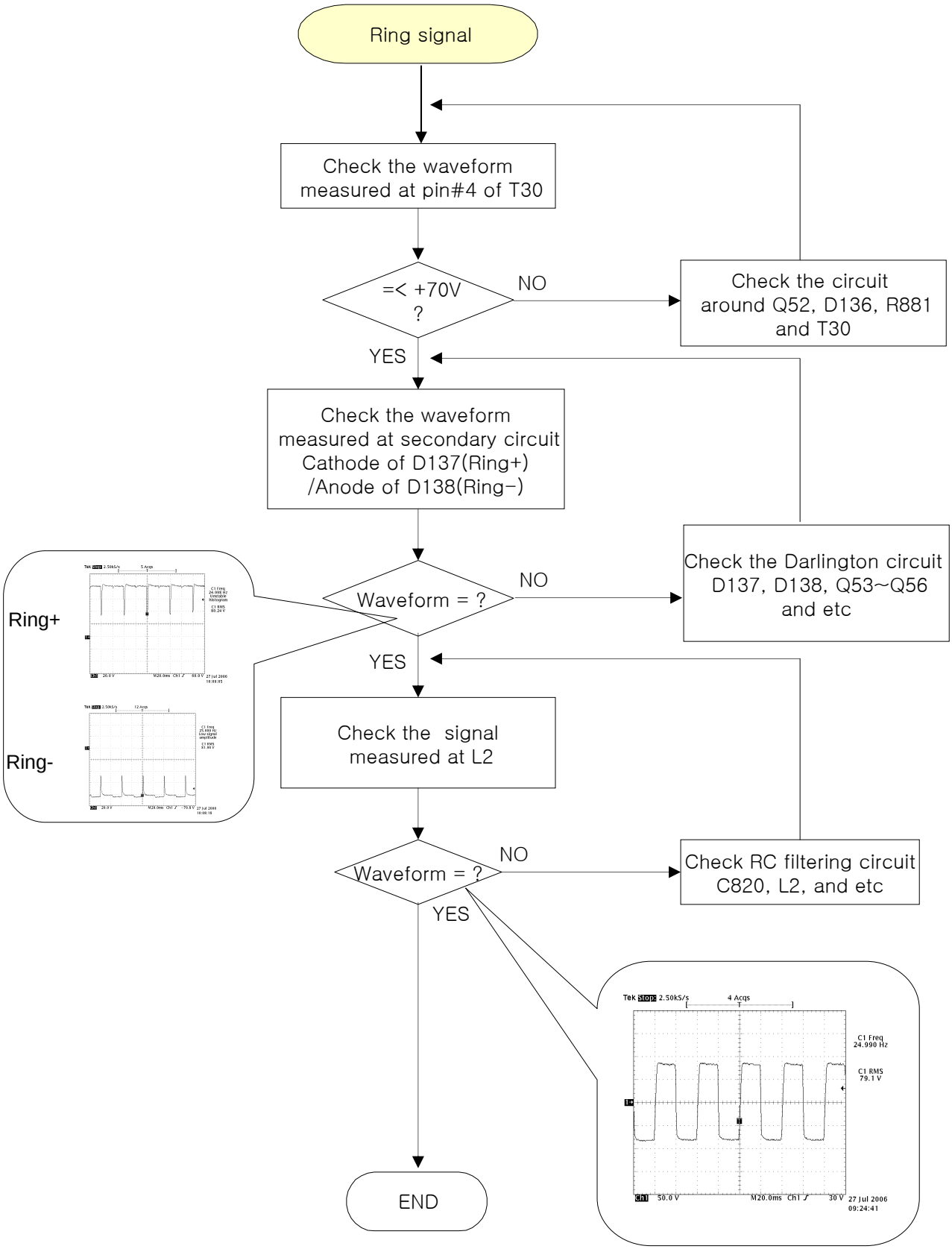
[25Hz Oscillation circuit]

1) 25Hz generation circuit



2) Ring signal generation circuit



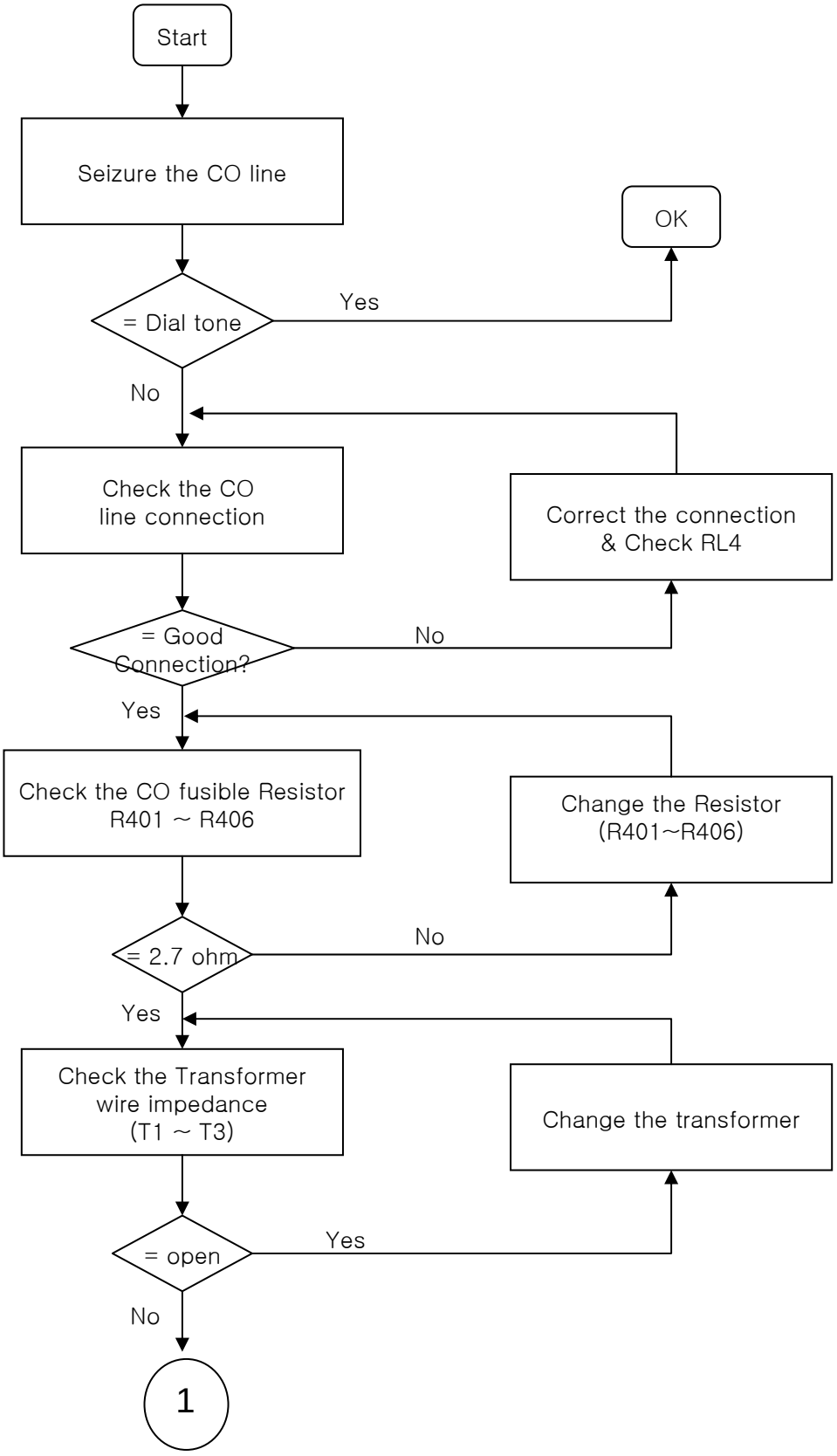


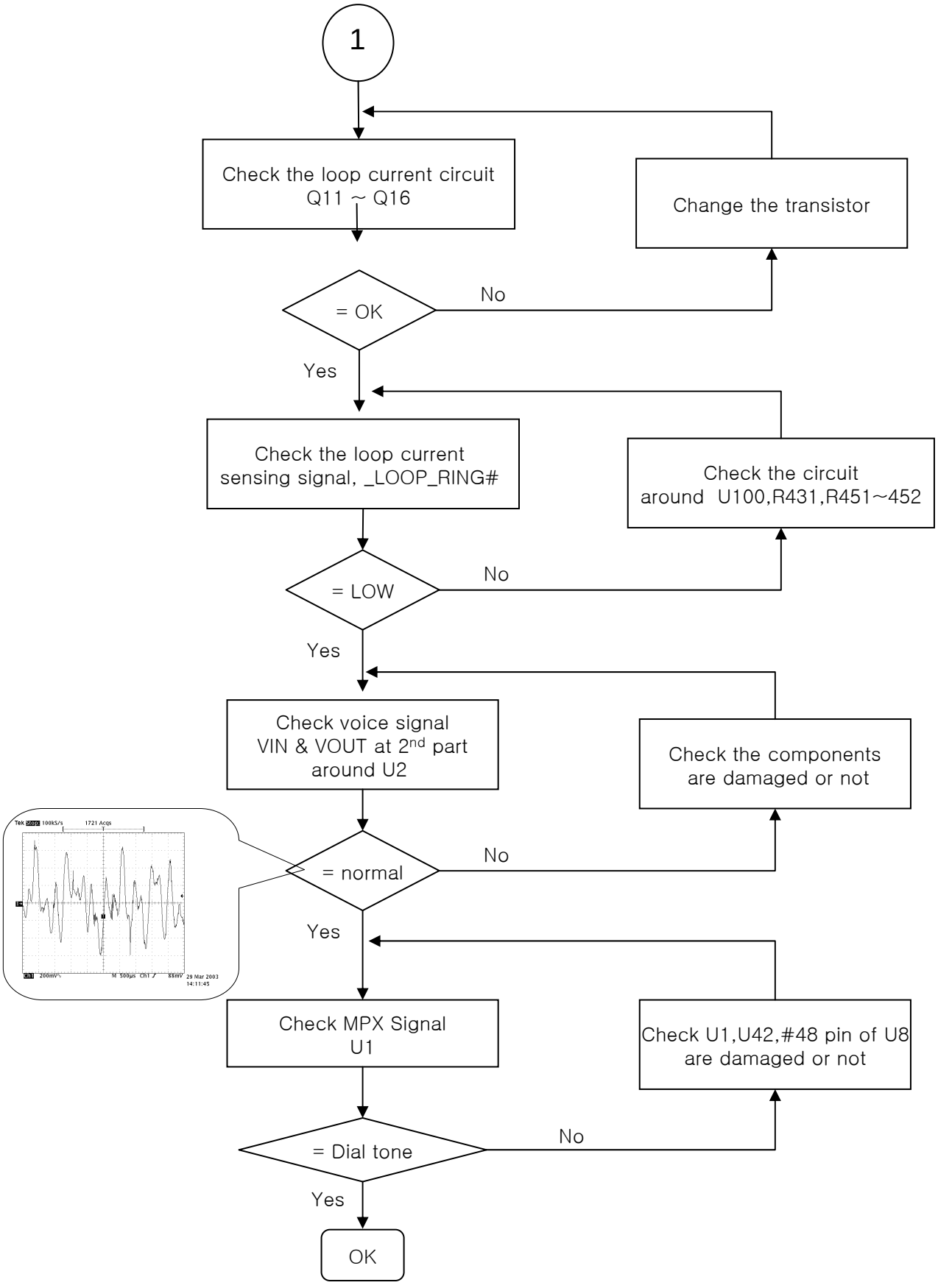
Ring signal: 25Hz, >50Vrms

2.8 CO interface circuit

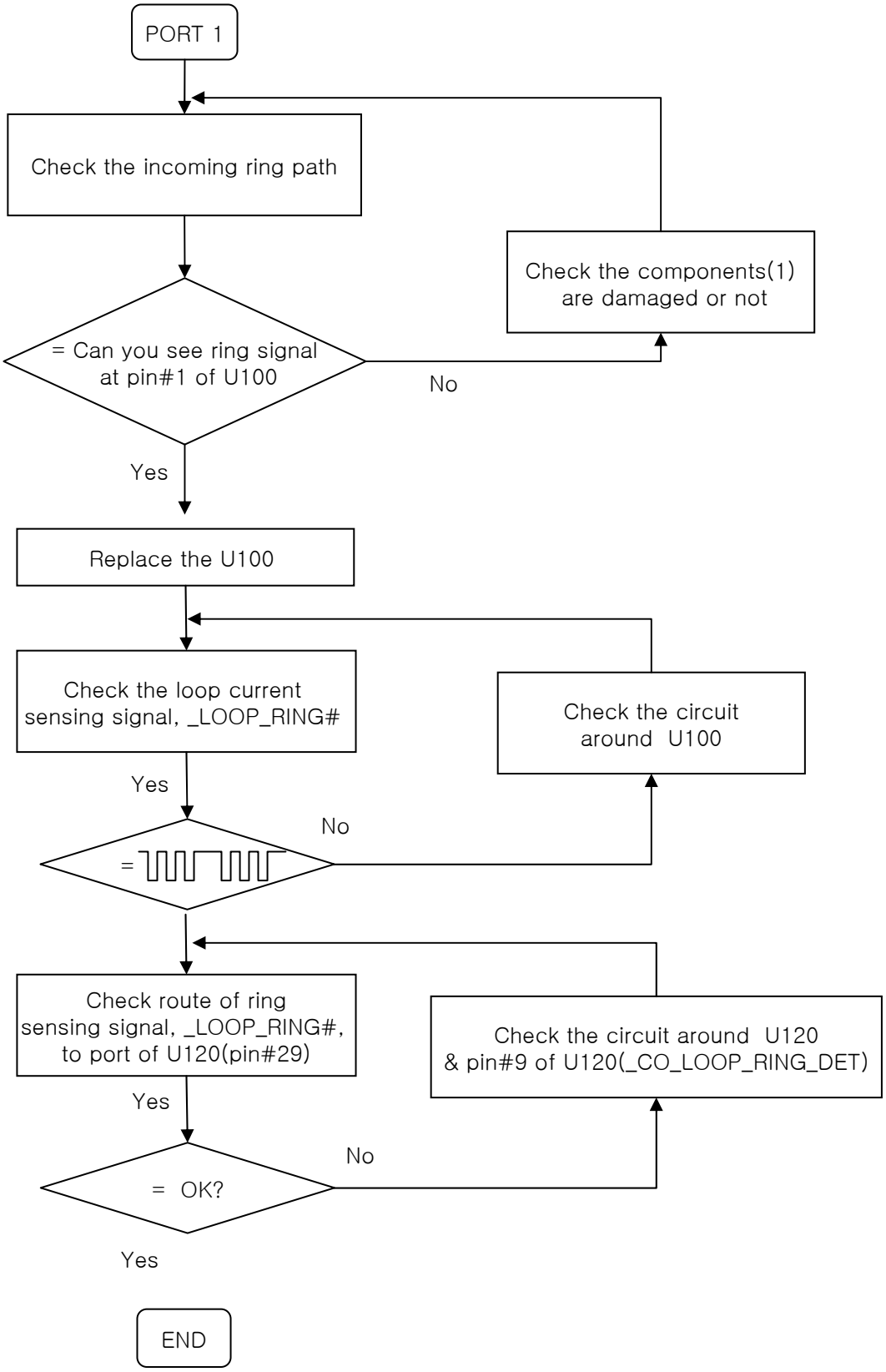
sheet 3/7

1) CO Dial tone check(1'st Port)




1
Check the loop current circuit
Q11 ~ Q16
Change the transistor
= OK
No
Yes
Check the loop current
sensing signal, _LOOP_RING#
Check the circuit
around U100,R431,R451~452
= LOW
No
Yes
Check voice signal
VIN & VOUT at 2nd part
around U2
Check the components
are damaged or not
= normal
No
Yes
Check MPX Signal
U1
Check U1,U42,#48 pin of U8
are damaged or not
= Dial tone
No
Yes
OK

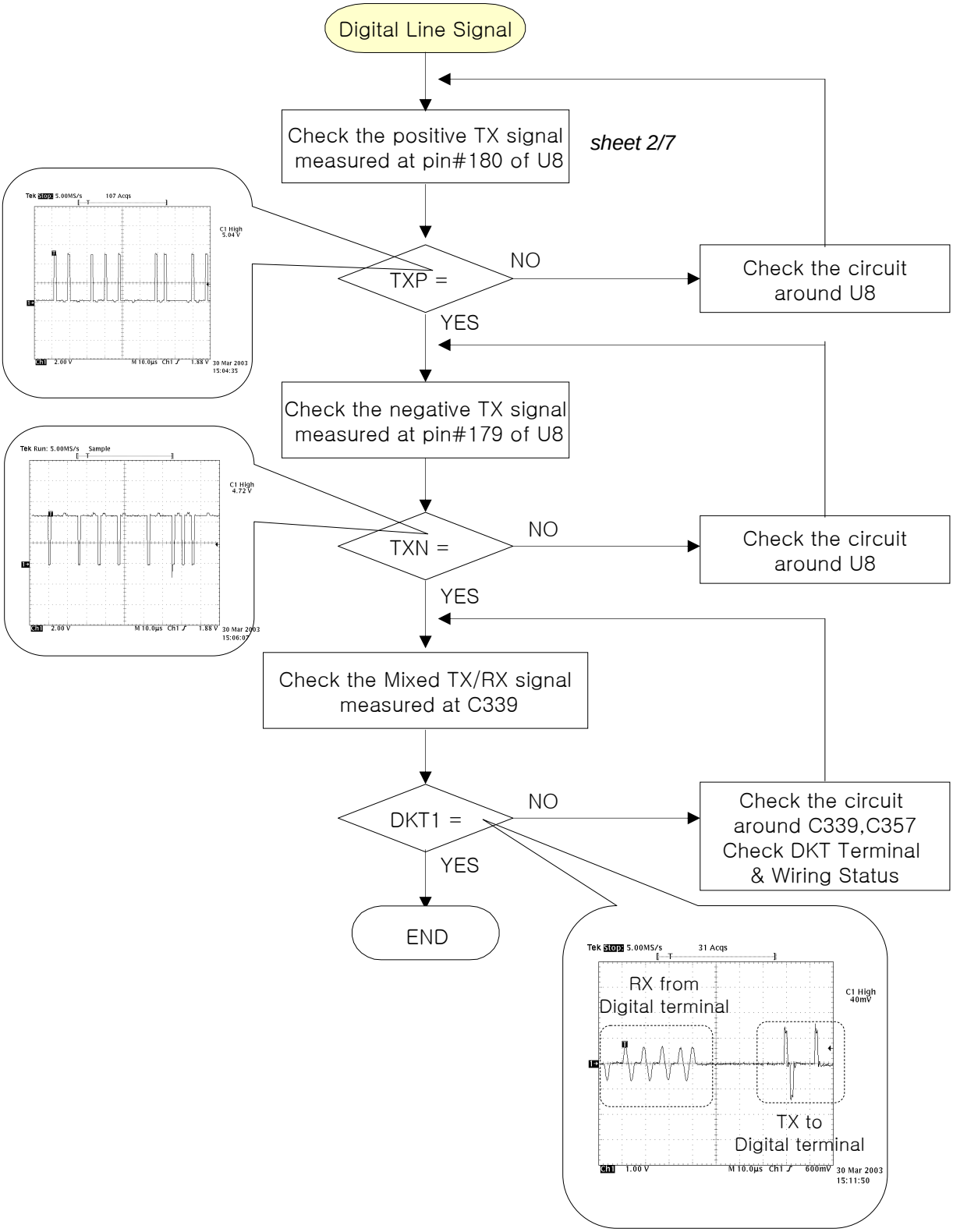
2) CO Ring detection check(1st Port)



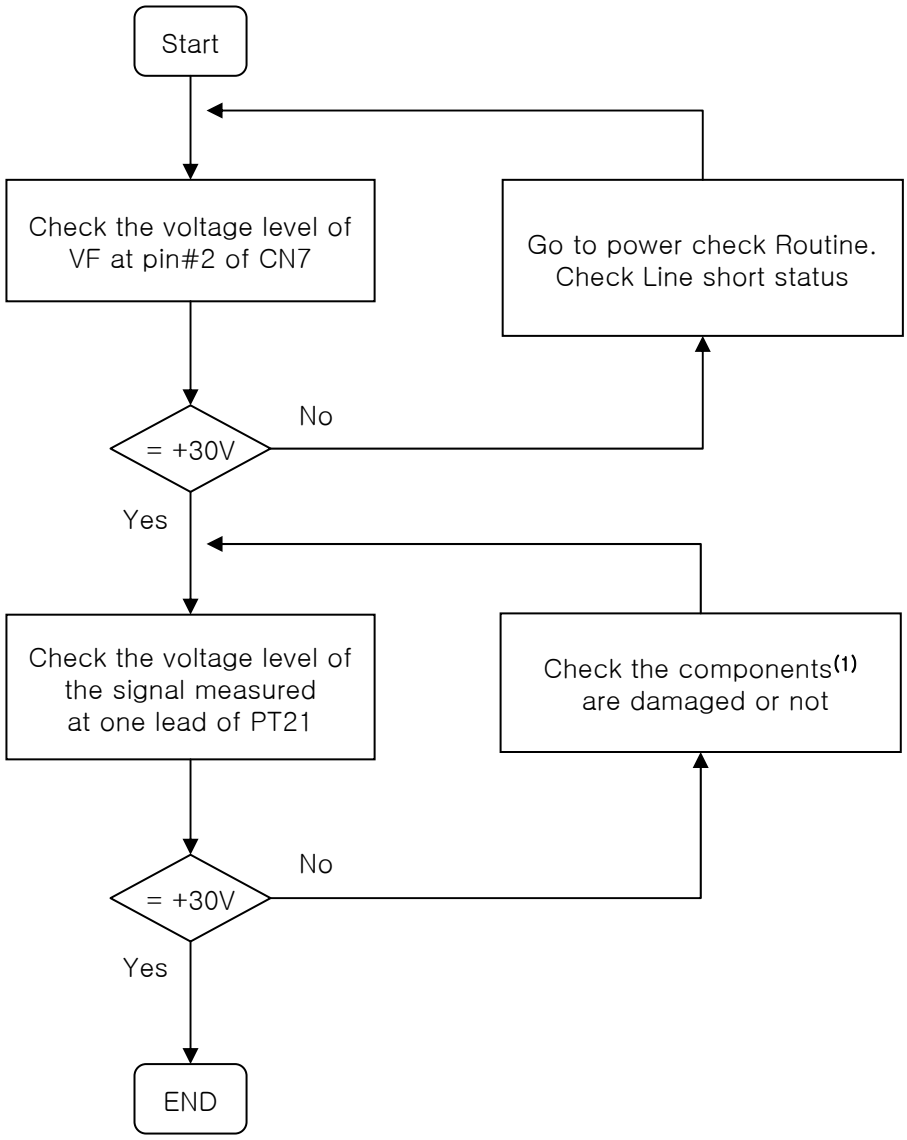
※ Note
(1) C401, R401,R402, RL4, R411, ZD11, ZD12, BD1, Q11, Q12, R421,R422,R431

2.9 Digital Terminal Interface(1st port) *sheet 6/7*

1) AMI signaling check



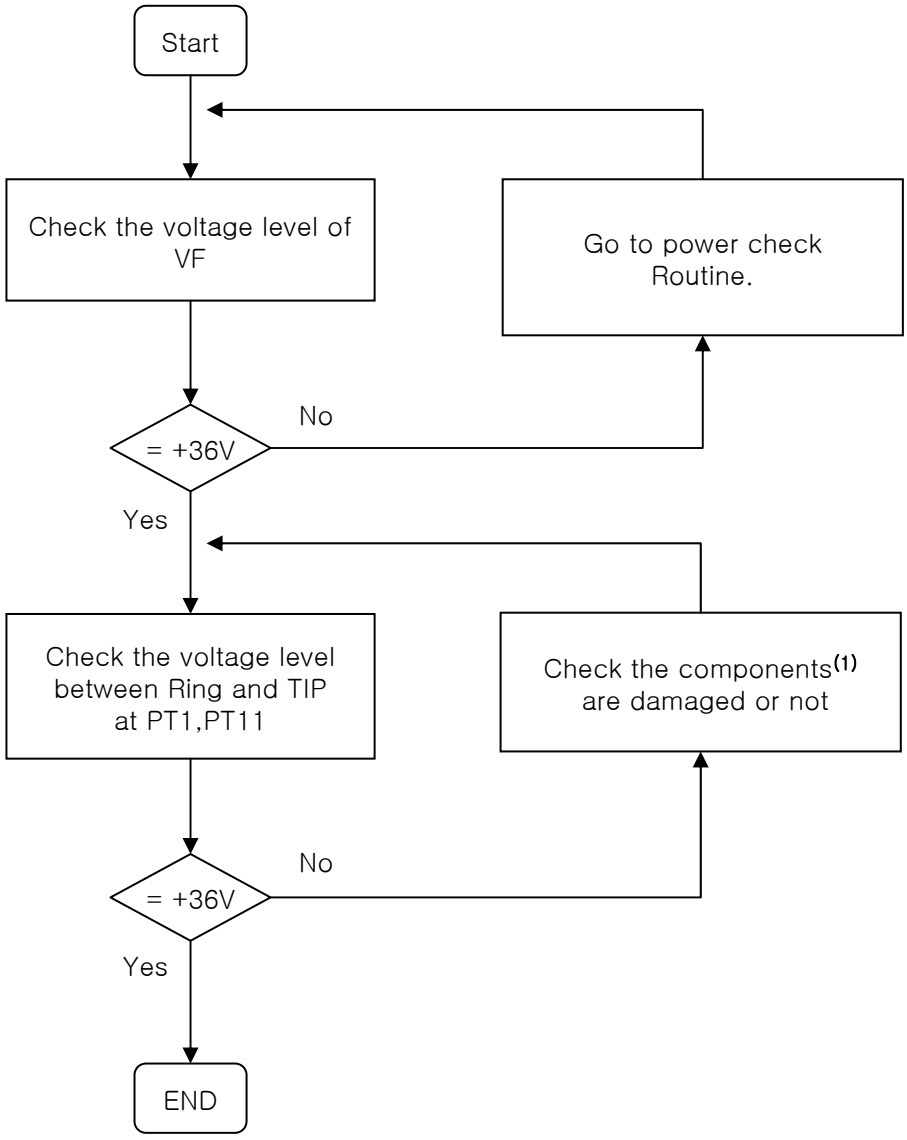
2) DKT Interface Line feeding voltage(+30V) check



※ Note
(1) PT21, T21, C741, C751, C761

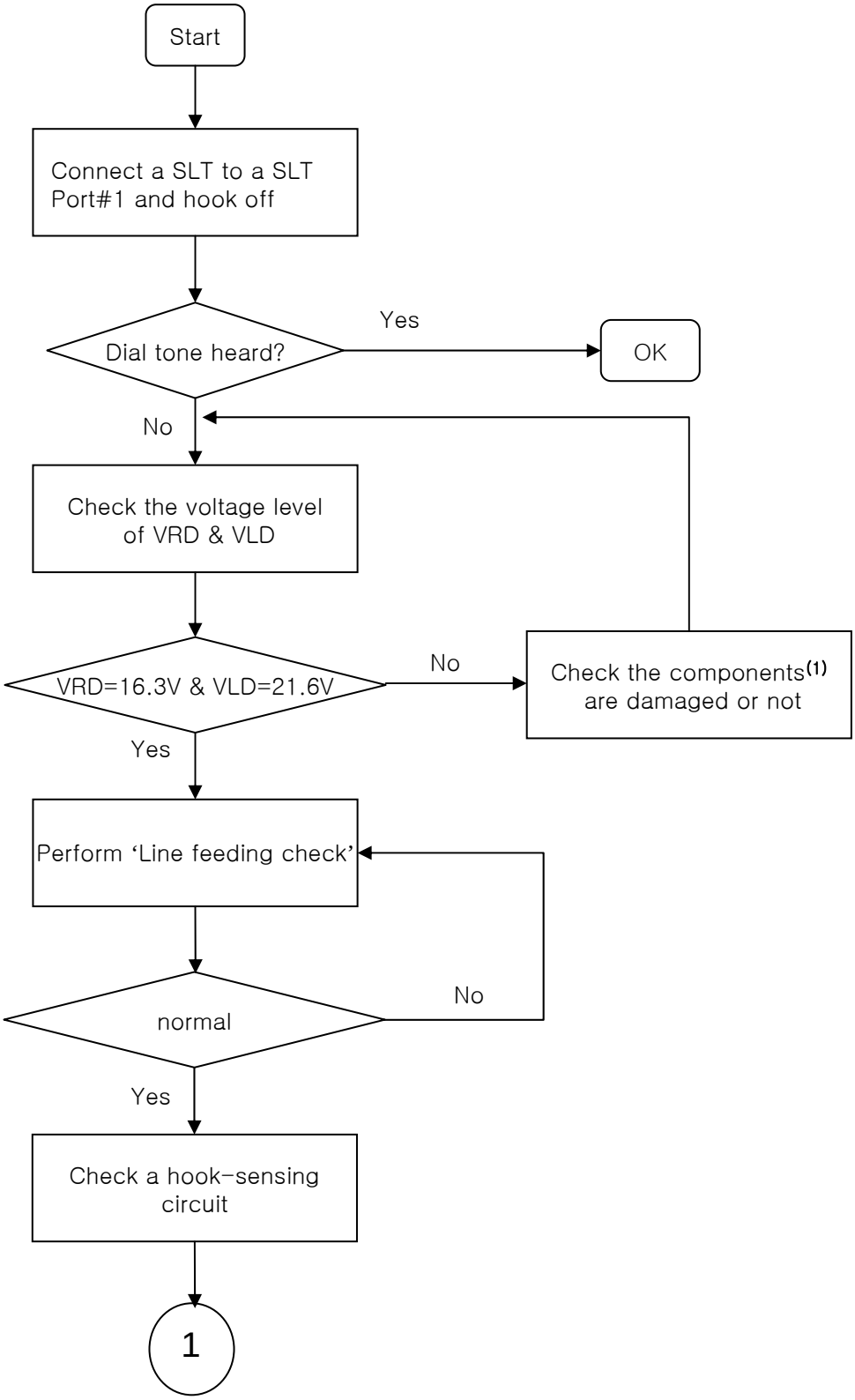
2.10 SLT interface circuit(1st port) *sheet 4,5/7*

1) Line feeding voltage(+36V) check

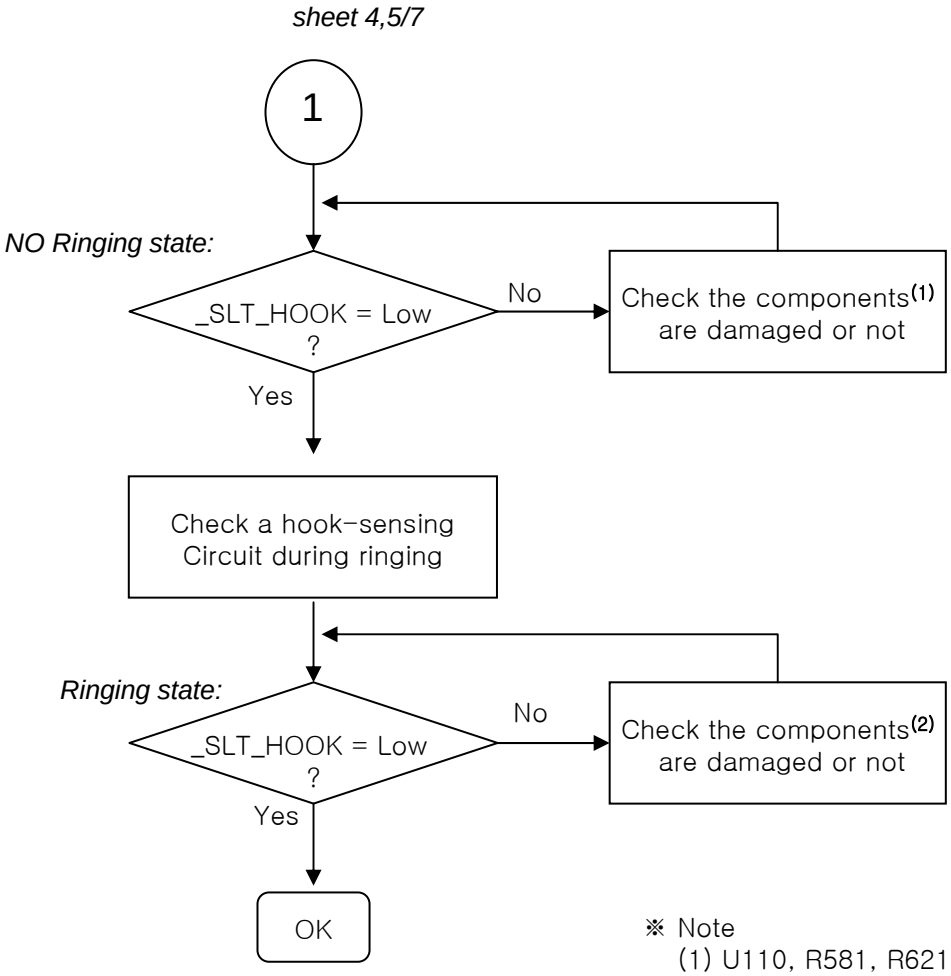


※ Note
(1) Q21, R541, R551, R561, Q31, R601, R611, R631,RL11,R501,R511

2) Hook-sensing check *sheet 4,5/7*

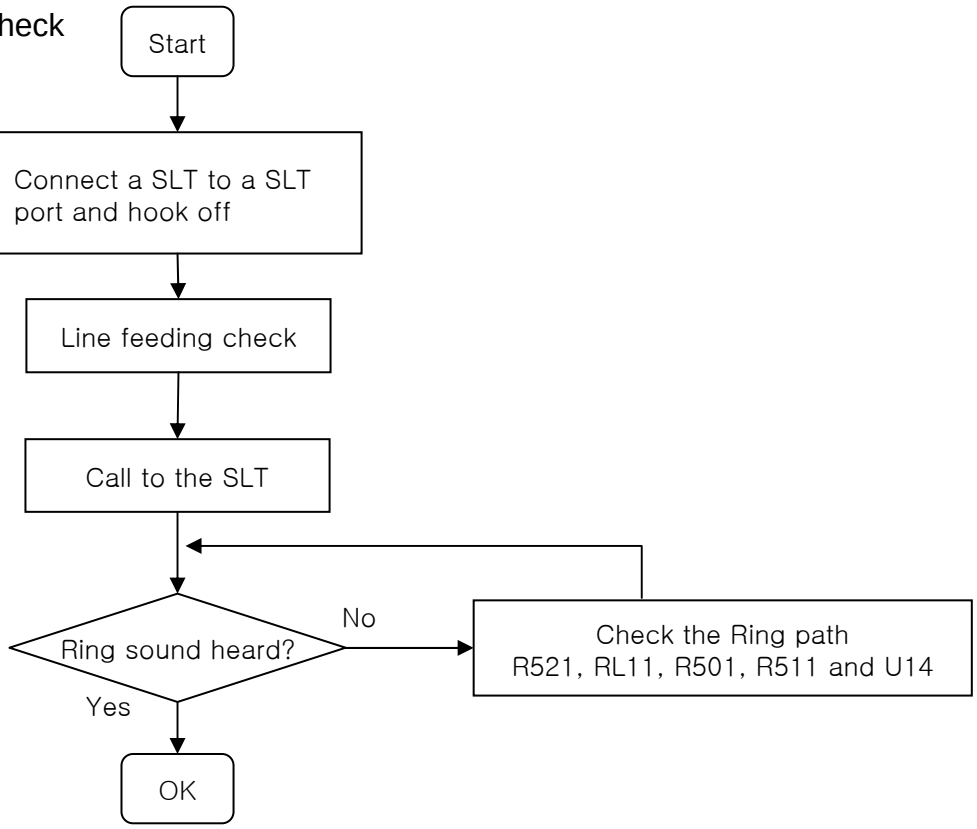


※ Note
(1) U110, U104, R581, R621, R591, C551,R720~723

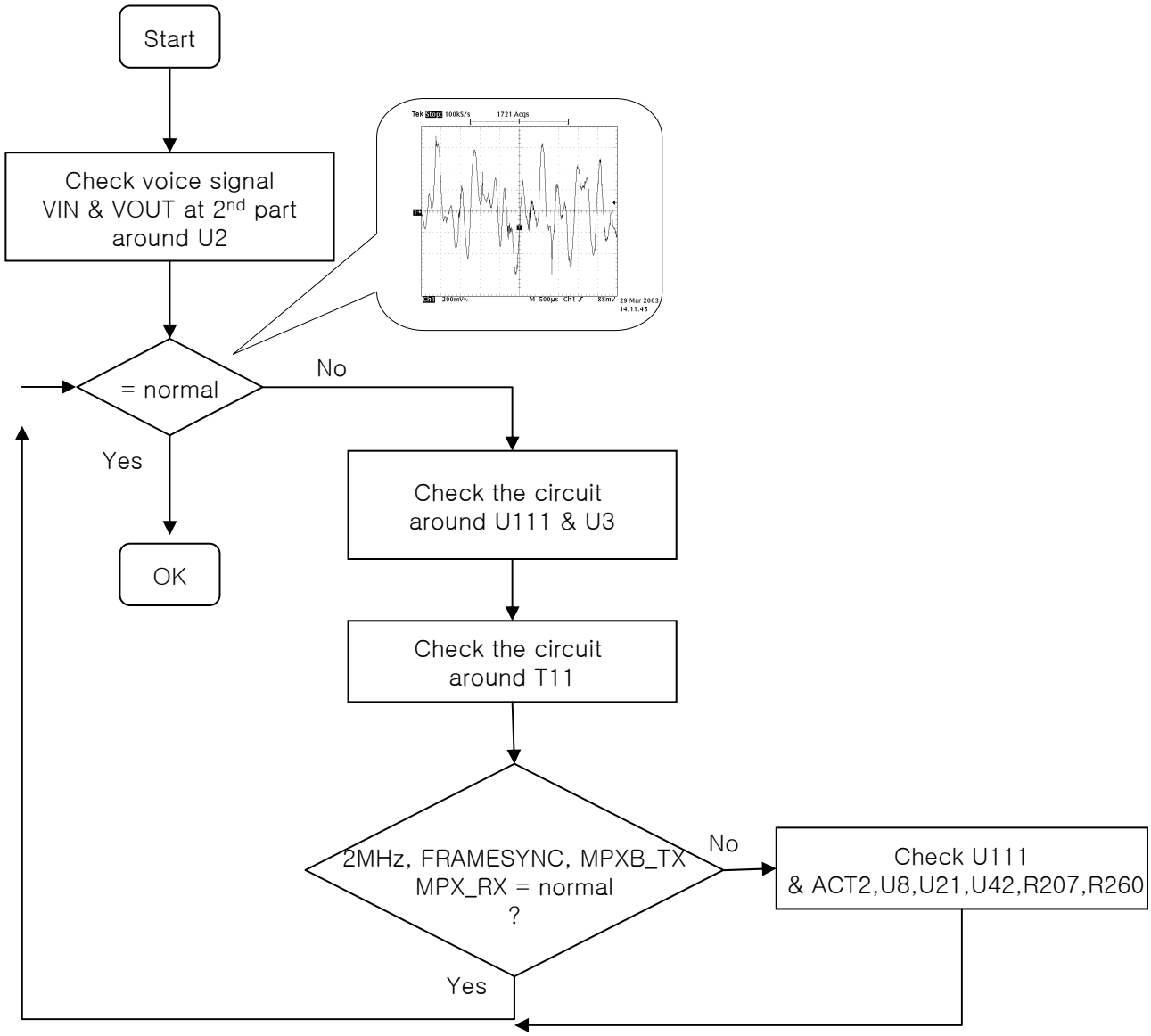


※ Note
(1) U110, R581, R621, C551, R591
(2) U104, R521, R531, C521, D21, ZD31

3) Ring path check

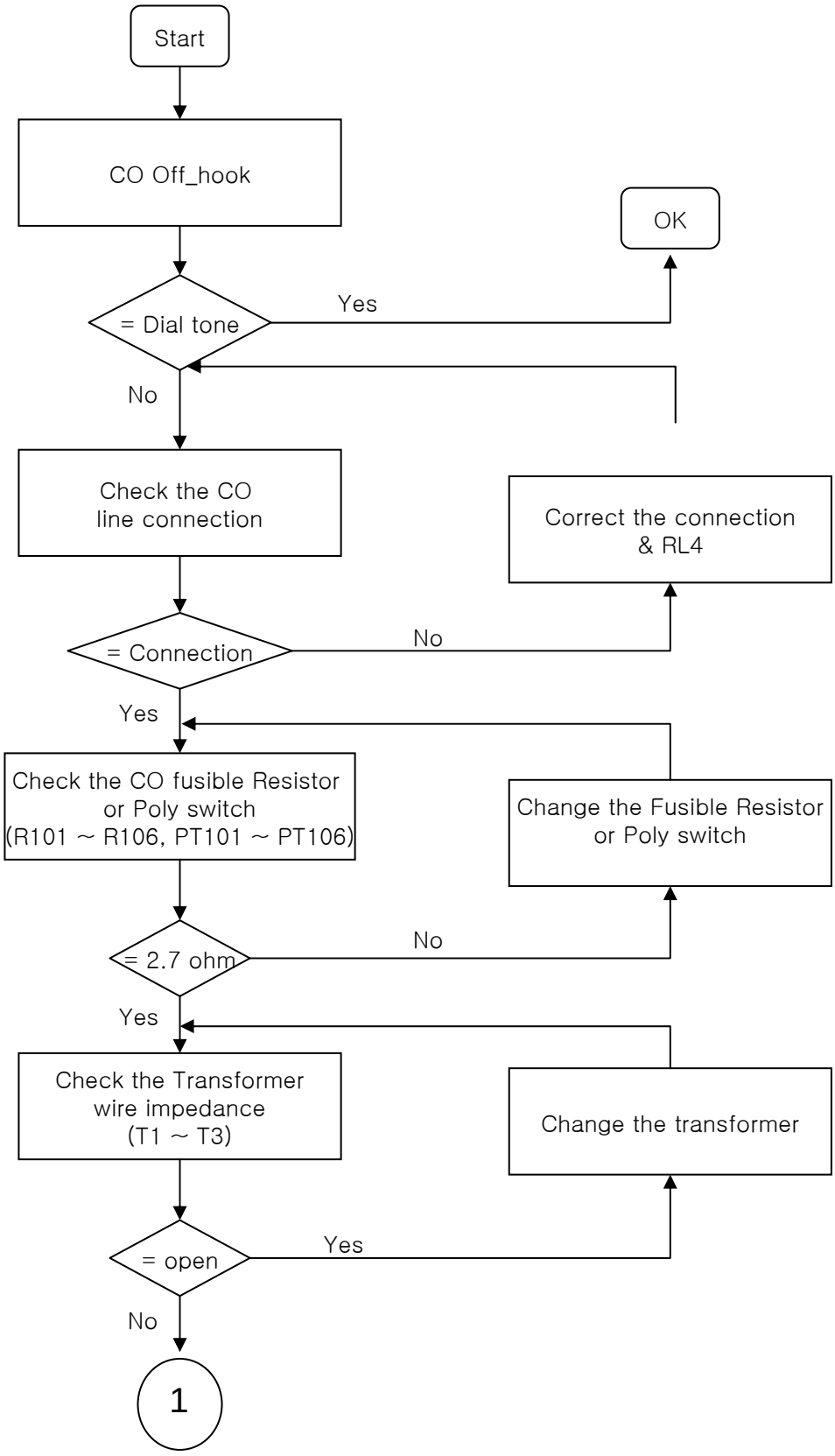


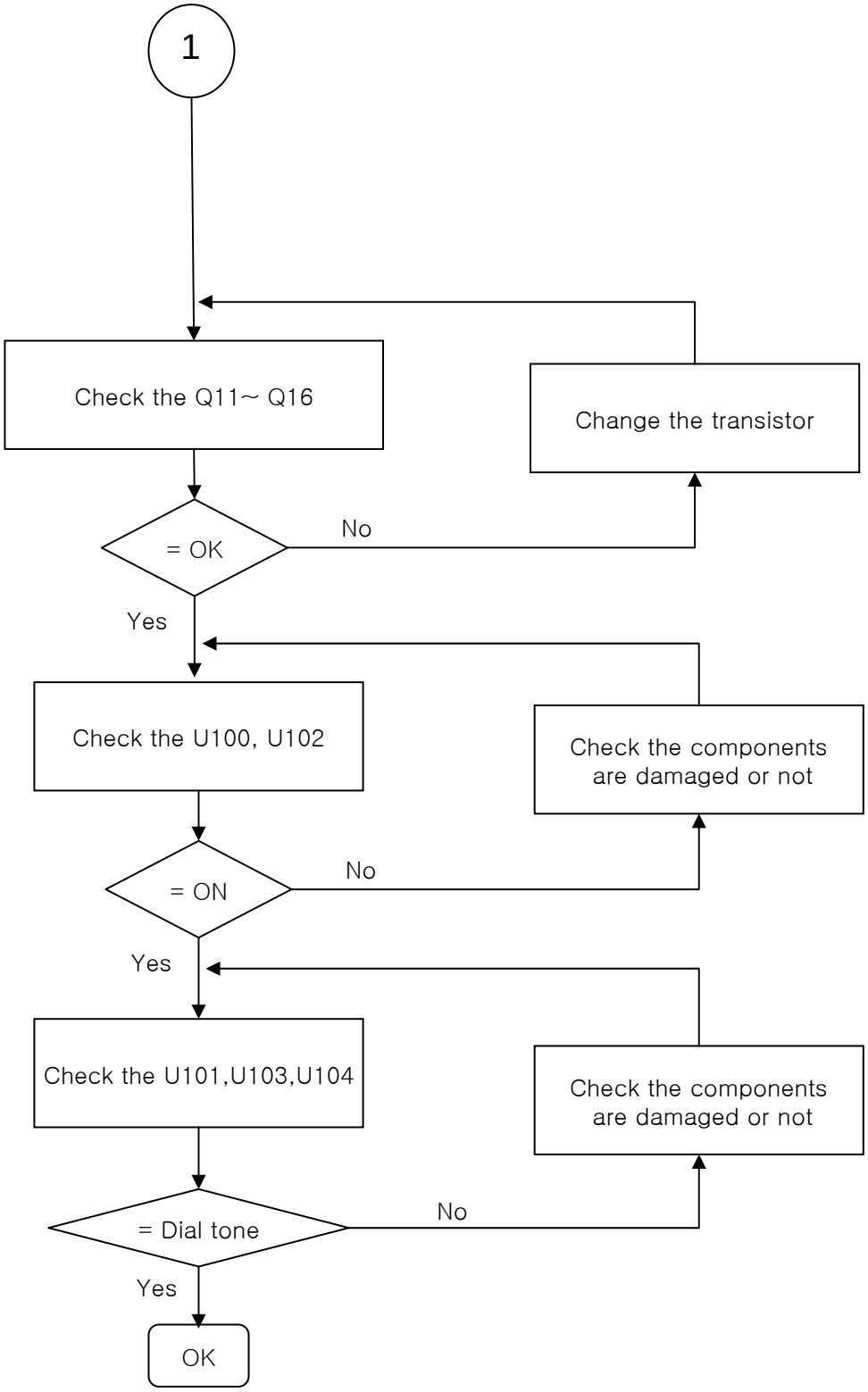
4) SLT Voice path check



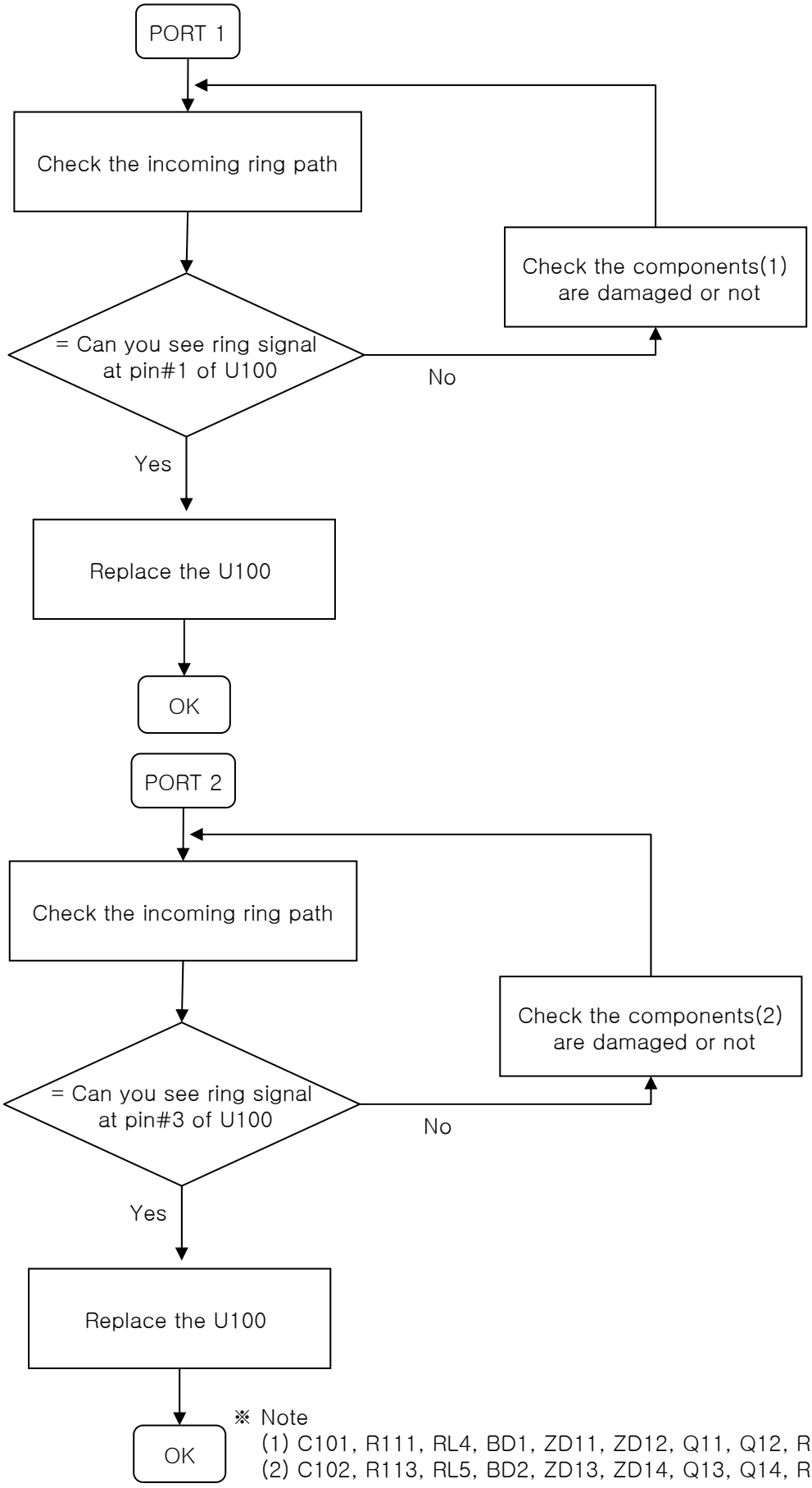
3. CHB308

3.1 CO Dial tone check

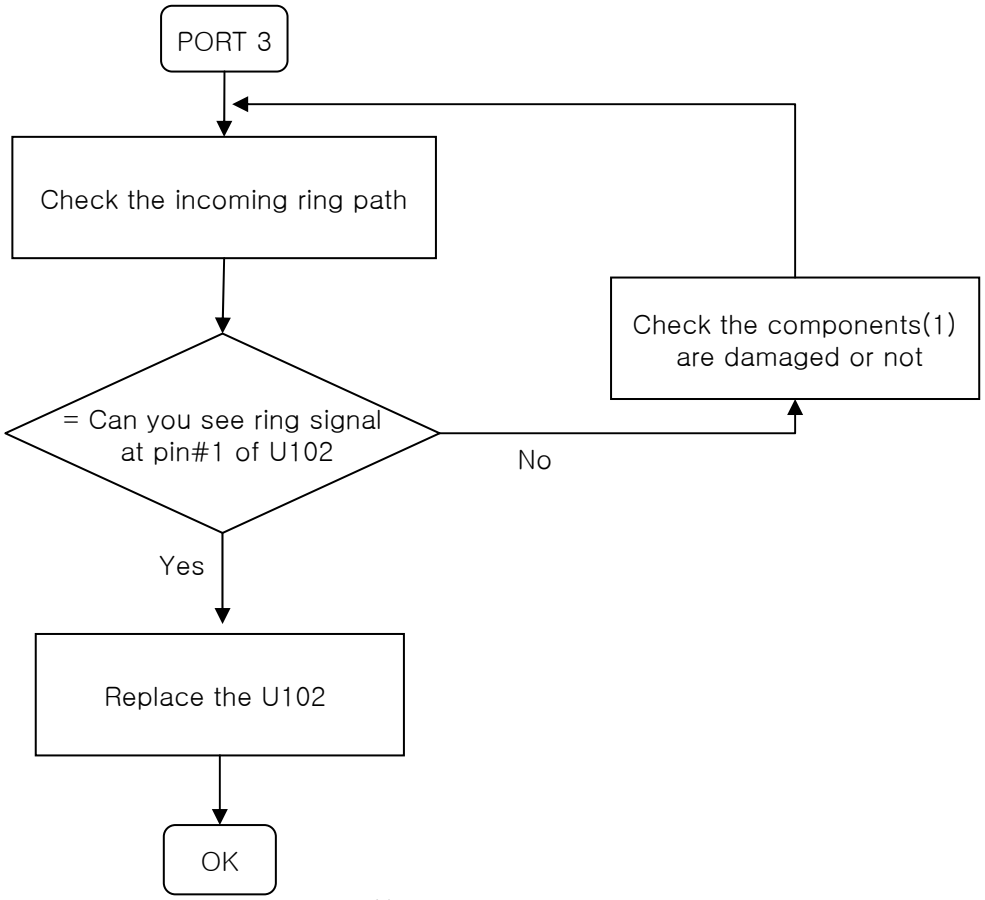



1
Check the Q11~ Q16
Change the transistor
= OK
No
Yes
Check the U100, U102
Check the components are damaged or not
= ON
No
Yes
Check the U101,U103,U104
Check the components are damaged or not
= Dial tone
No
Yes
OK

3.2 CO Ring detection check



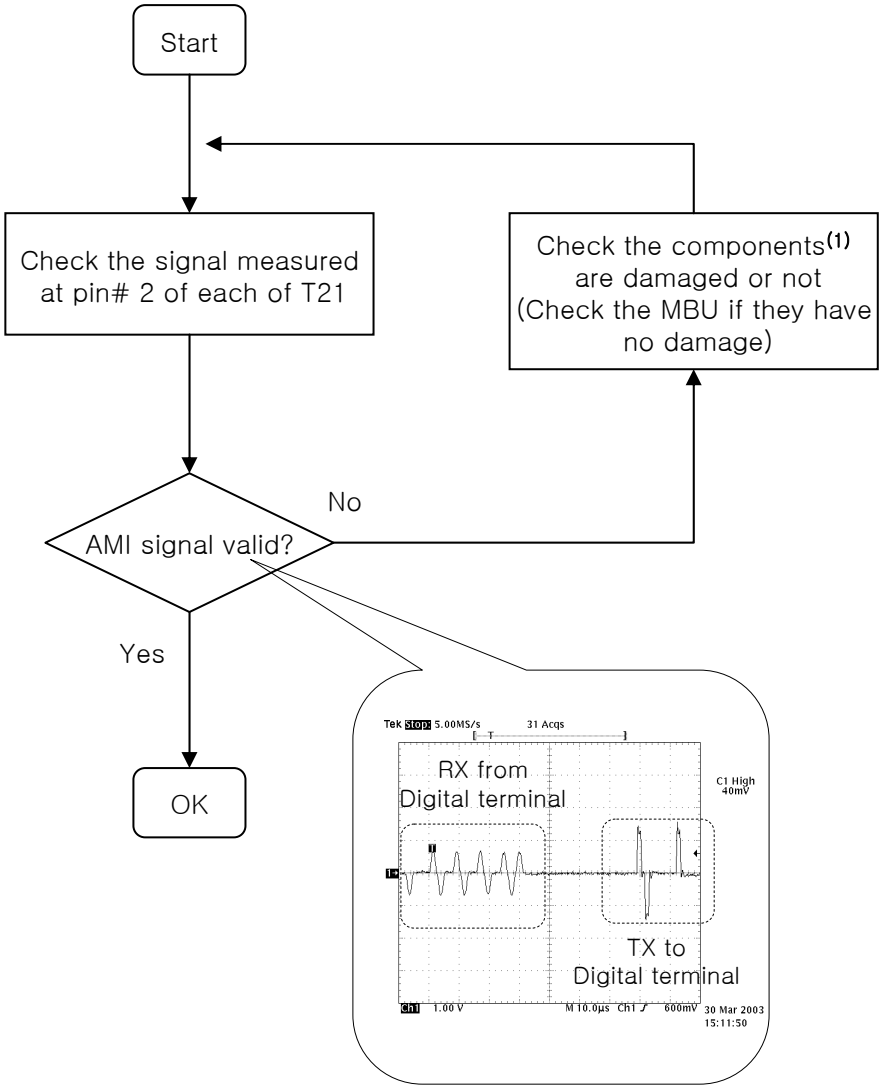
※ Note
(1) C101, R111, RL4, BD1, ZD11, ZD12, Q11, Q12, R121, R122
(2) C102, R113, RL5, BD2, ZD13, ZD14, Q13, Q14, R123, R124



※ Note
C103, R115, ZD15, ZD16, BD3, Q15, Q16, R125, R126

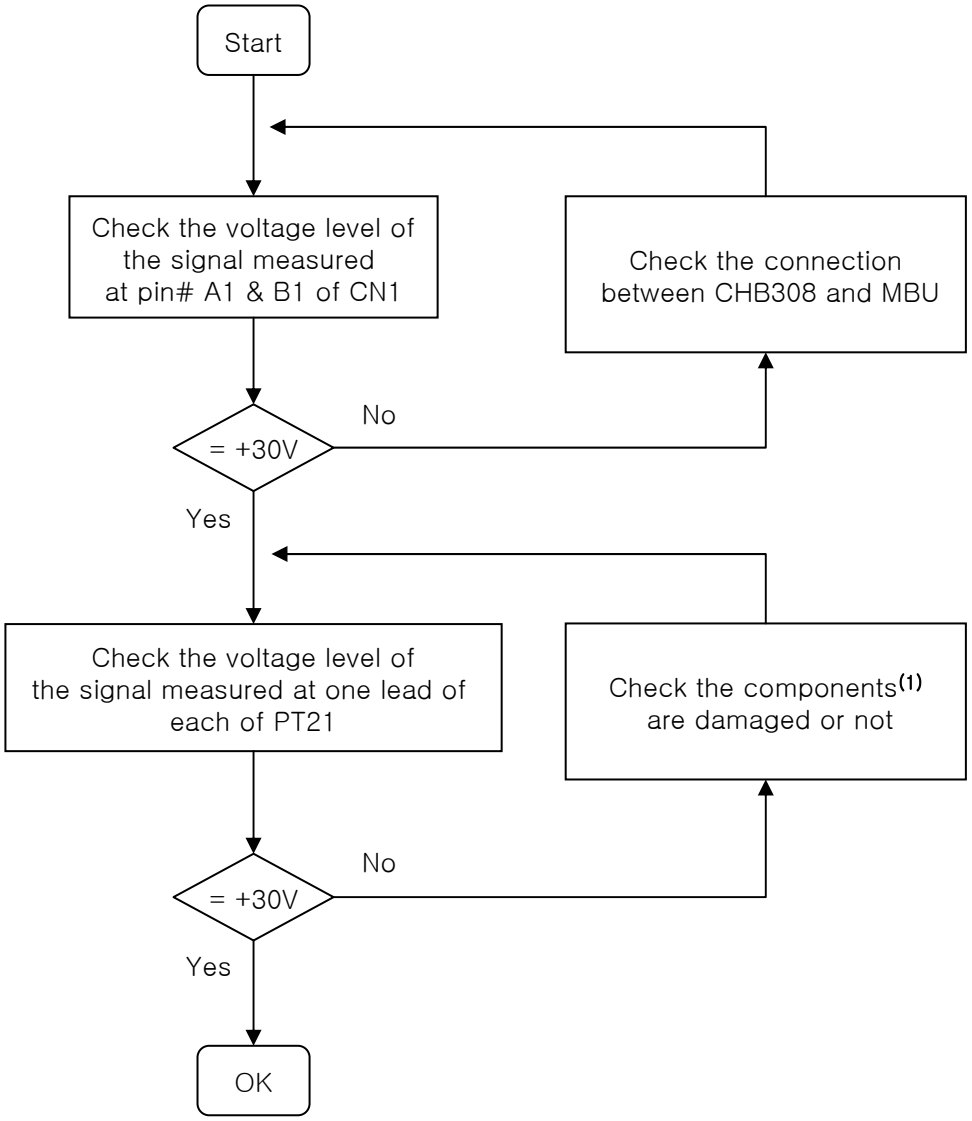
3.3 Digital Terminal Interface(1st port)

1) AMI signaling check



※ Note
(1) T21 ~ T28

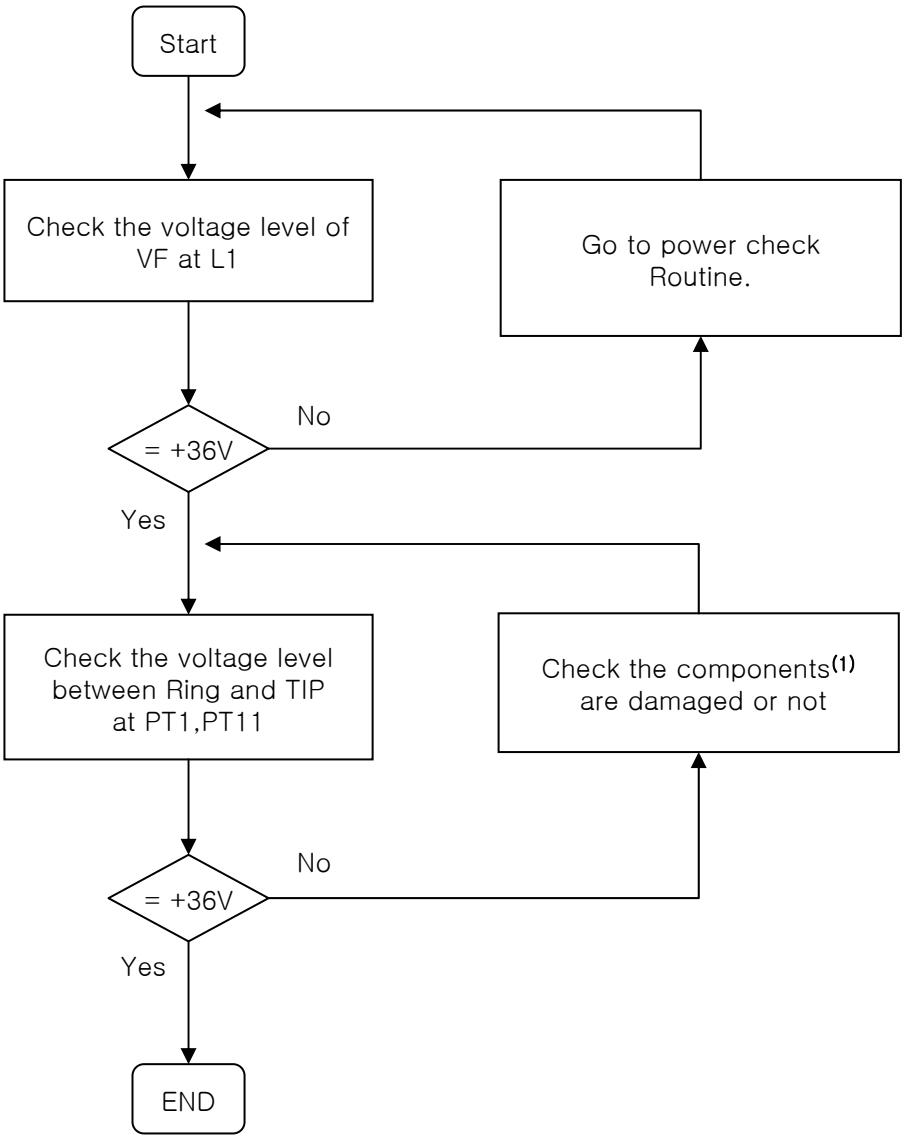
2) DKT Interface Line feeding voltage(+30V) check



※ Note
(1) PT21~PT28, T21~T28, C541 ~ C548, C551 ~ C558, C561 ~ C568

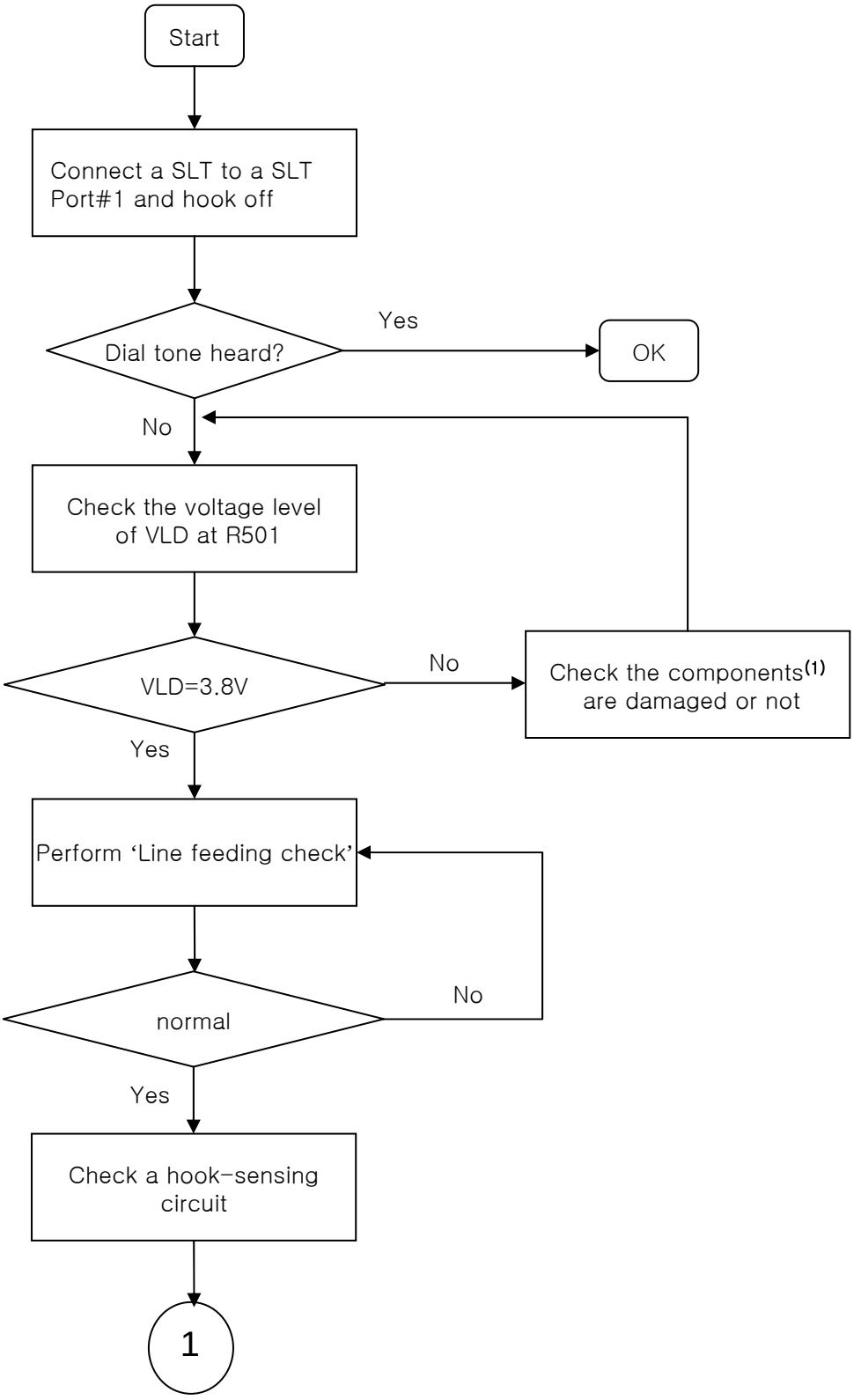
3.4 SLT interface circuit(1st port)

1) SLT Line feeding voltage(+36V) check

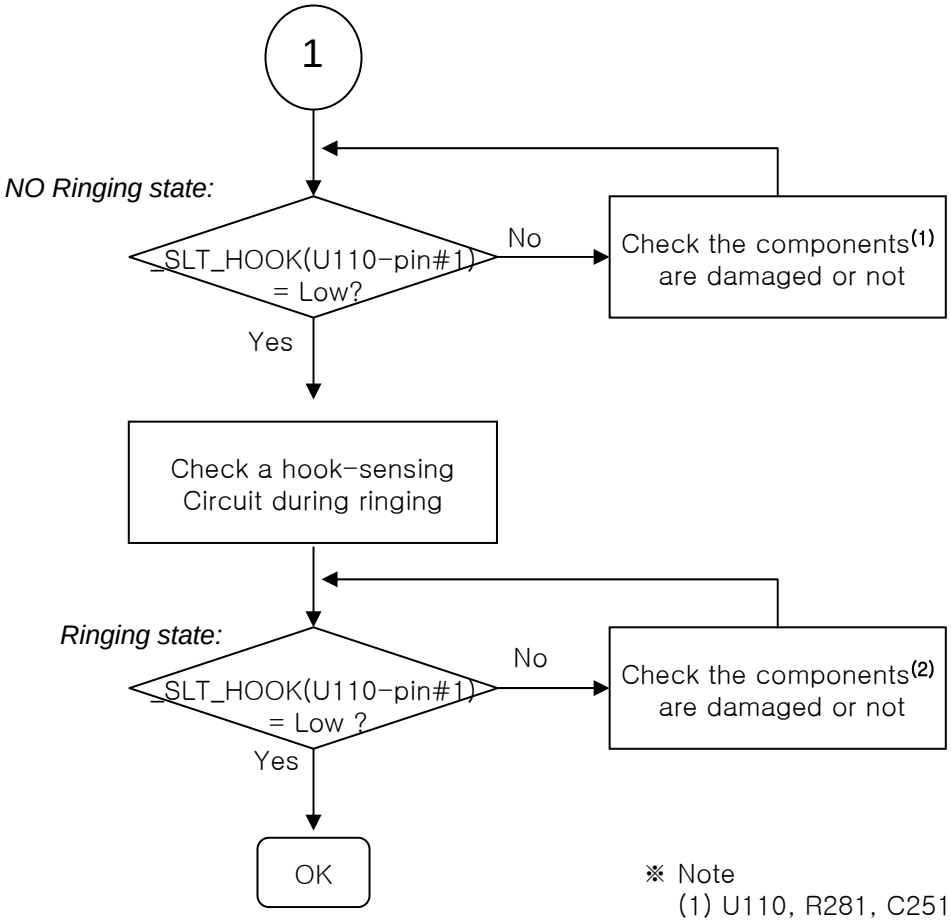


※ Note
(1) Q21, C241, R251, R261, Q31, R301, R311, R331, RL11,R201,R211

2) Hook-sensing check

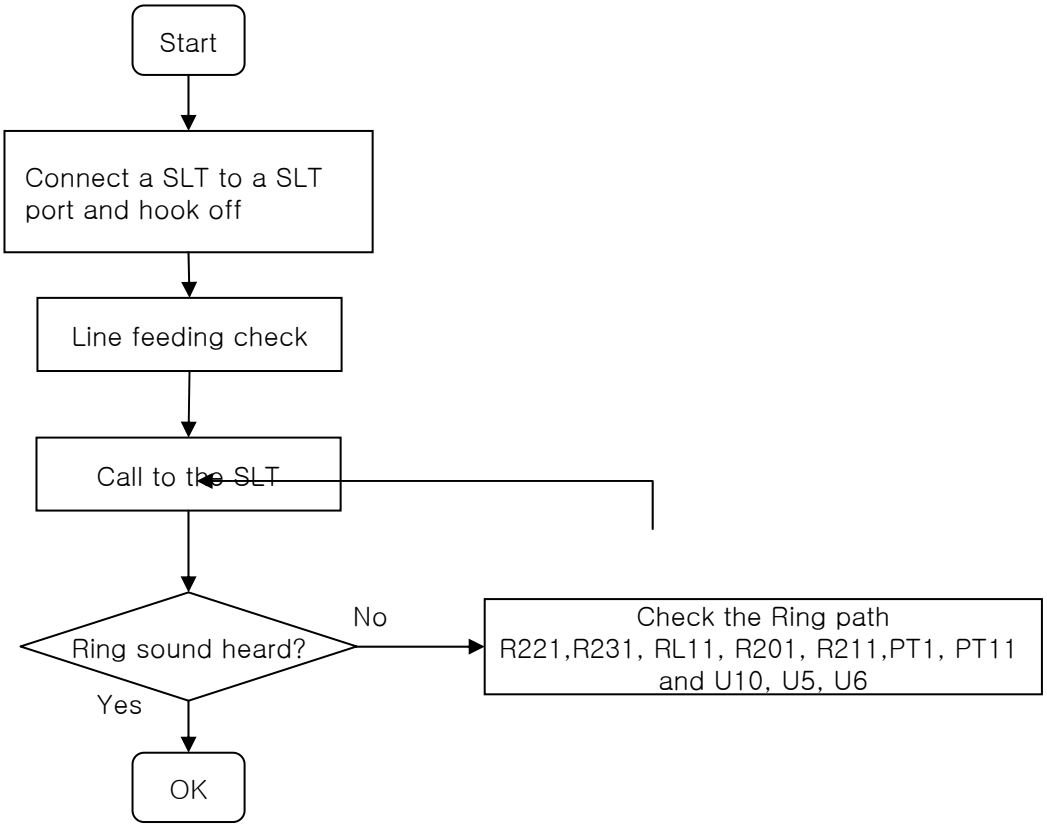


※ Note
(1) U110, R291,R281,C251,R501,R503

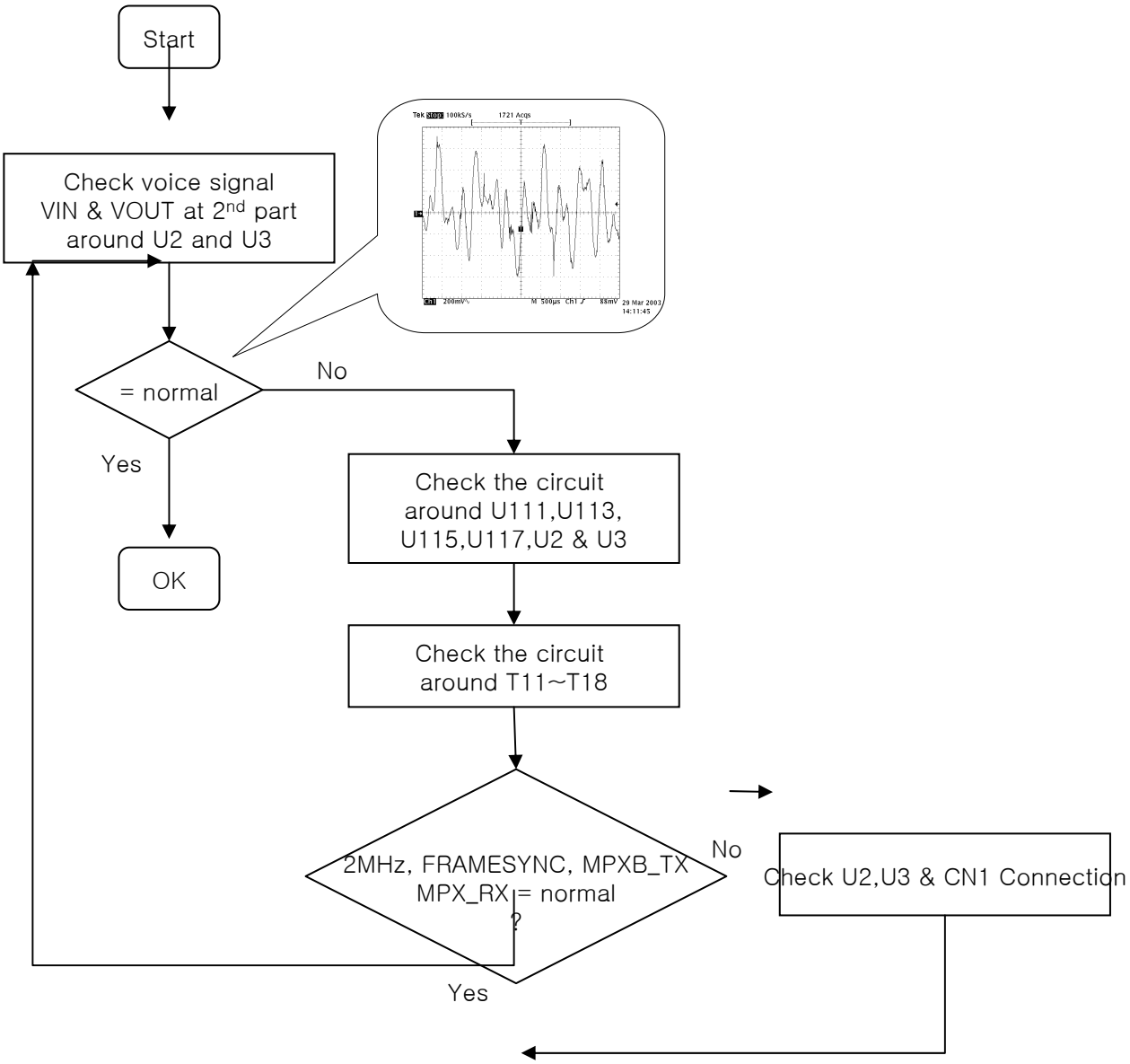


※ Note
(1) U110, R281, C251
(2) R221, R231, R291, C221, D21

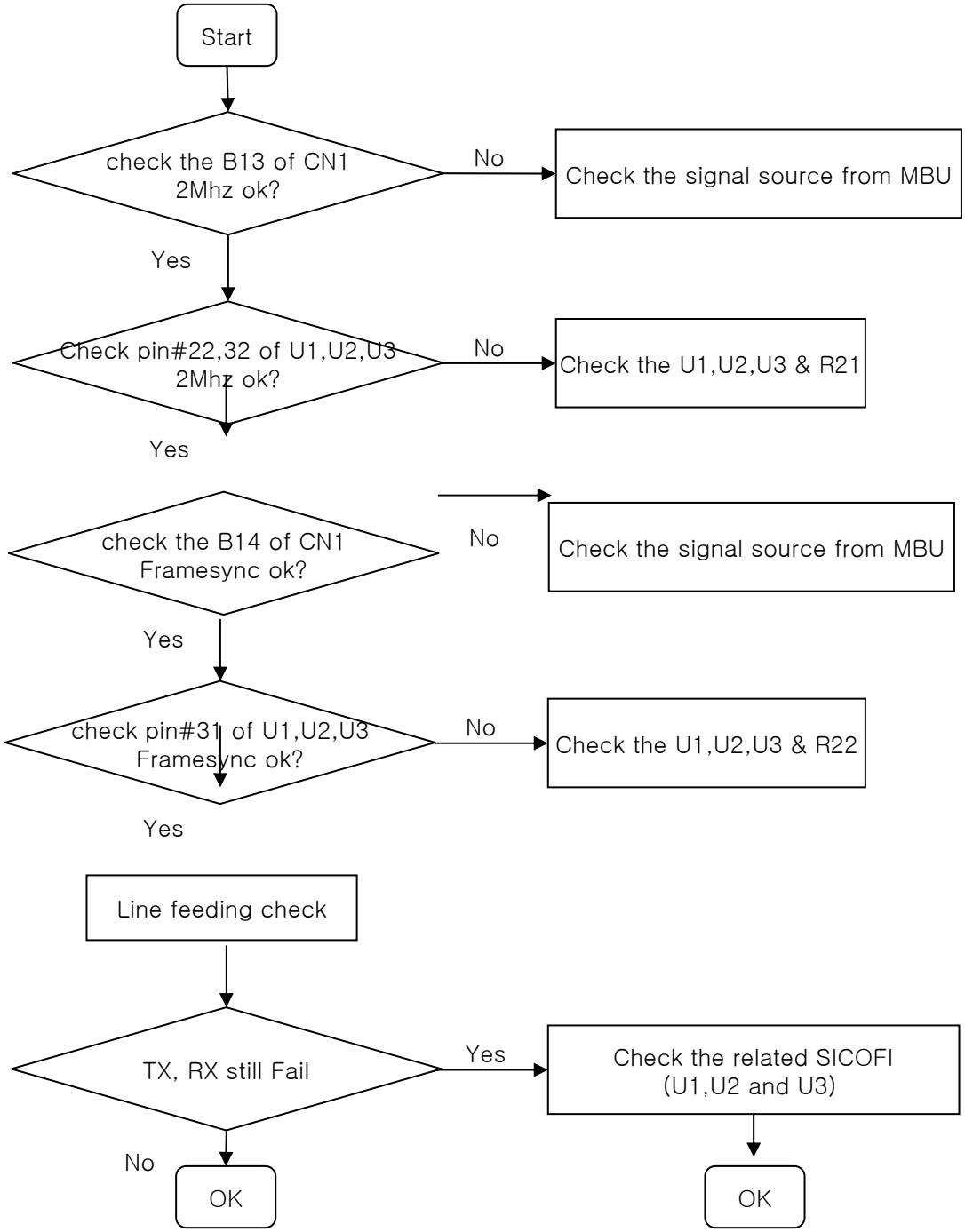
3) SLT Ring path check



4) SLT Voice path check

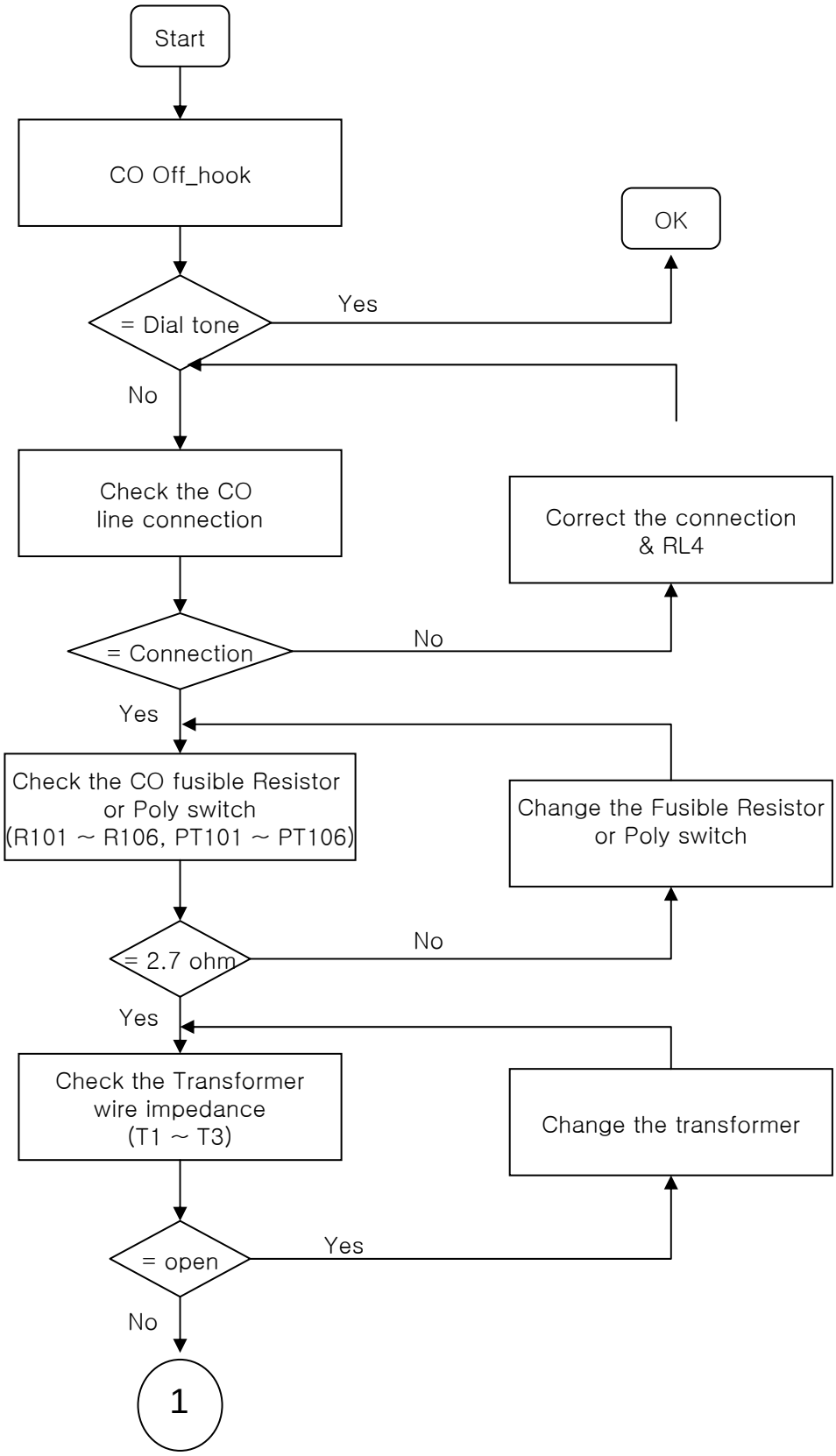


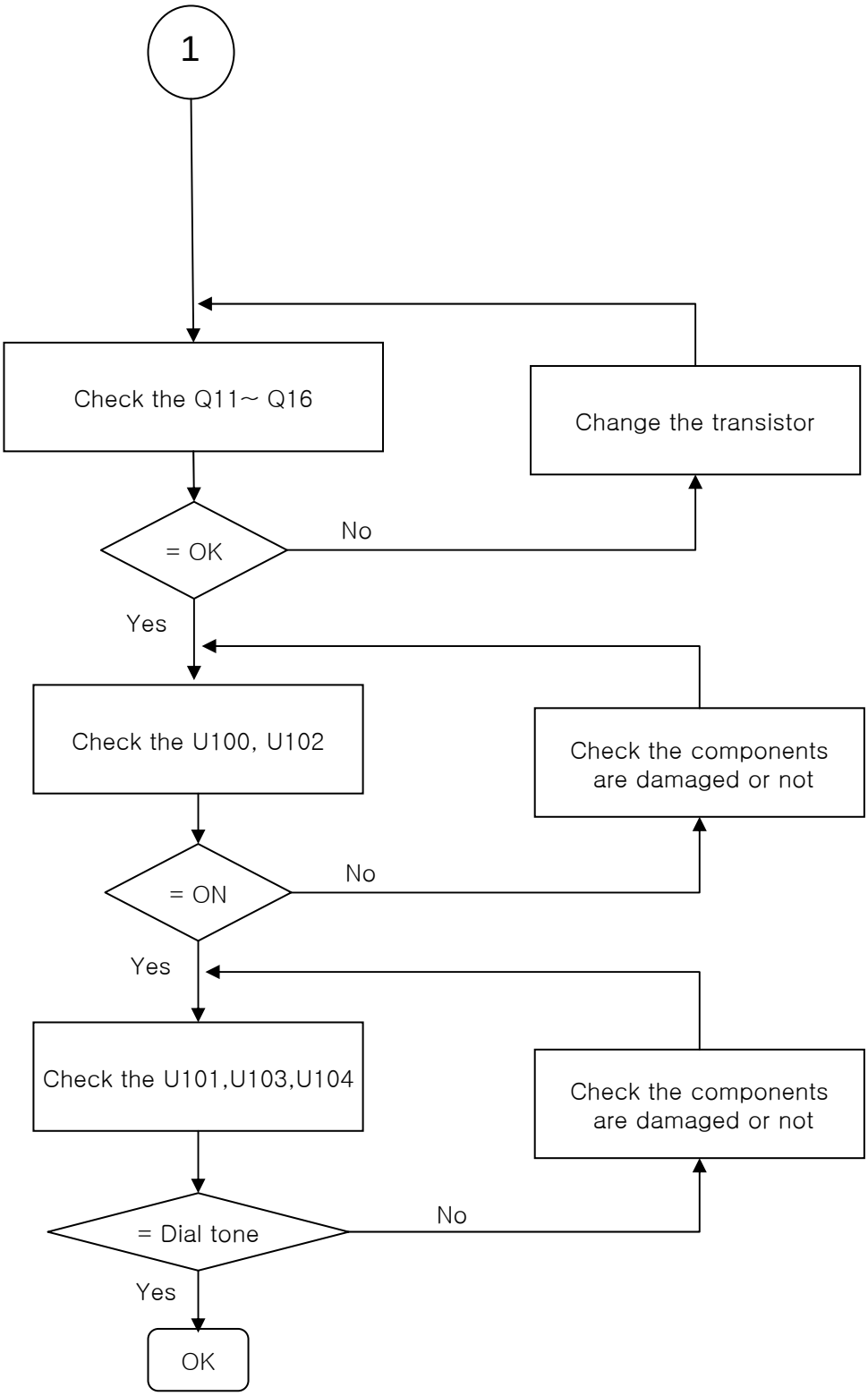
3.5 Rx or Tx Fail



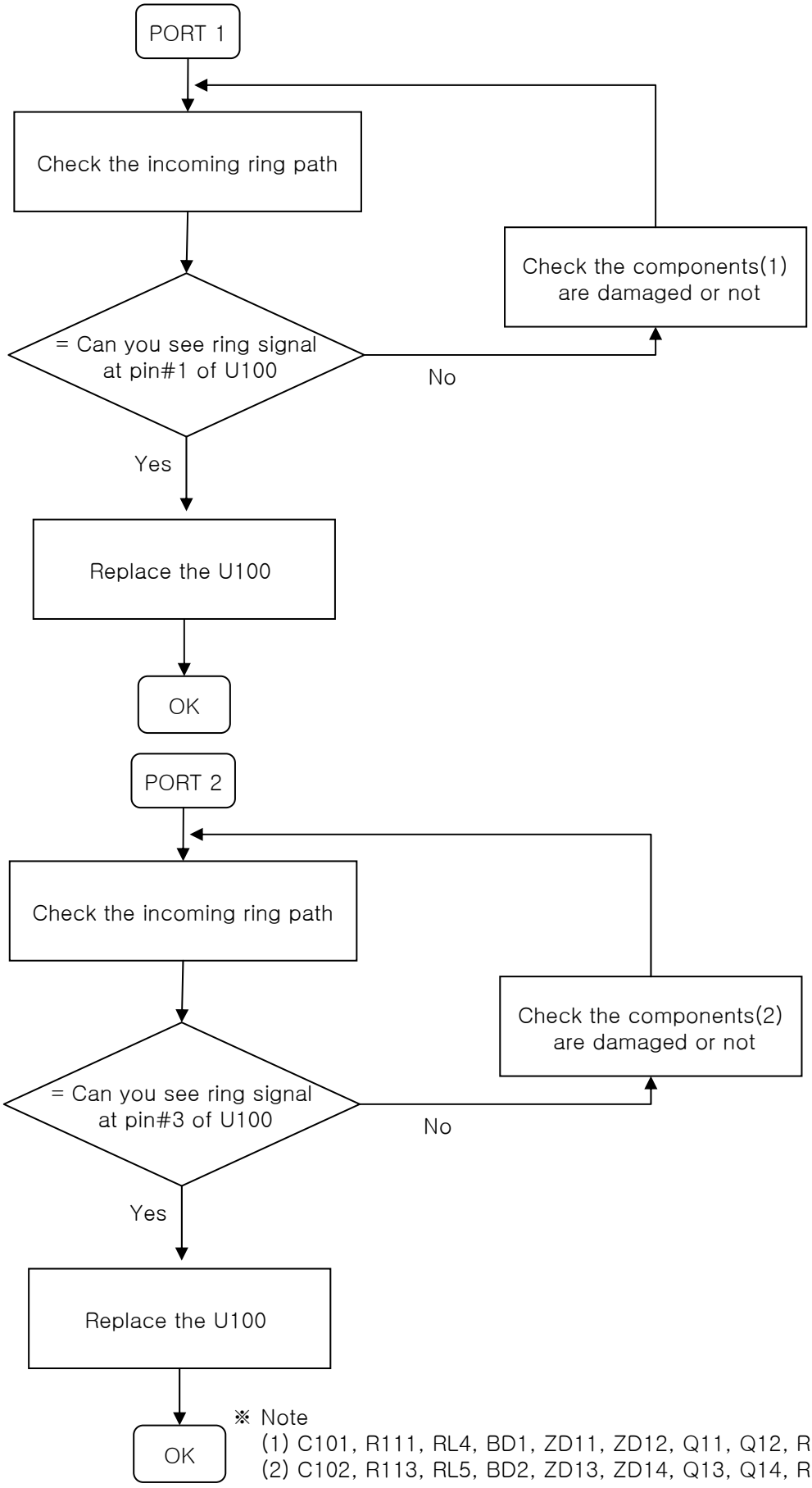
4. CSB316

4.1 CO Dial tone check

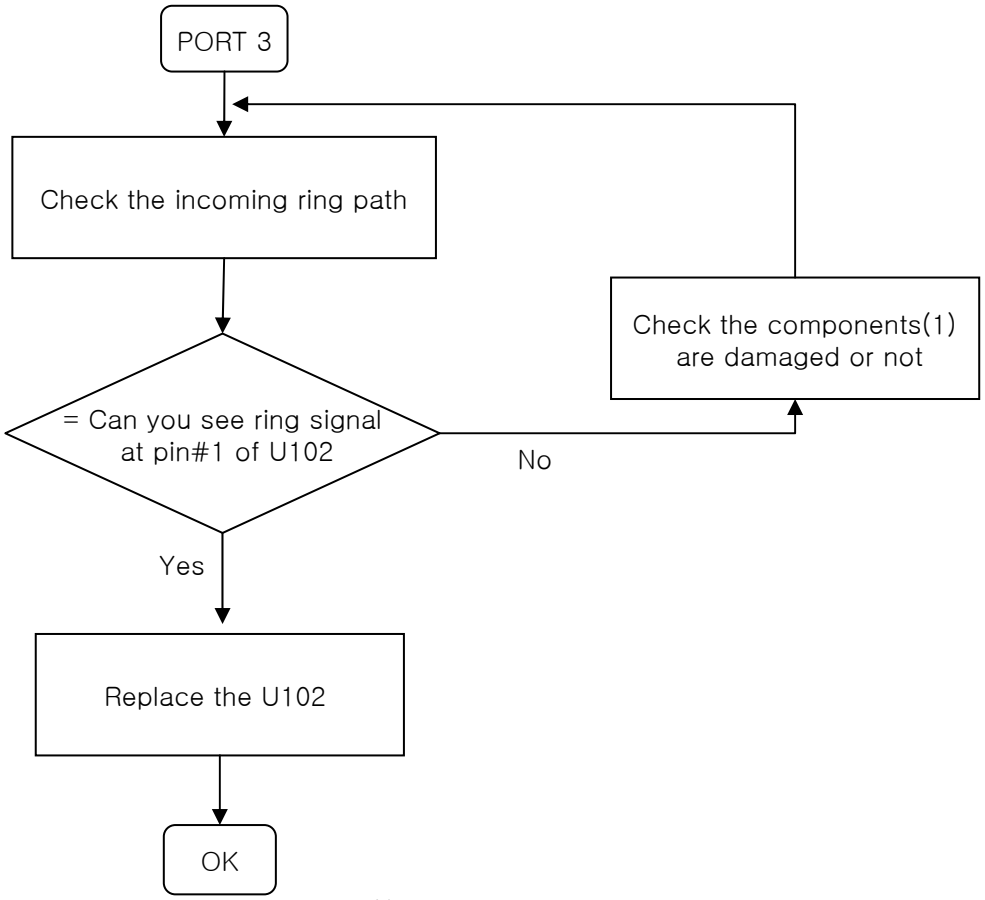



1
Check the Q11~ Q16
Change the transistor
= OK
No
Yes
Check the U100, U102
Check the components are damaged or not
= ON
No
Yes
Check the U101,U103,U104
Check the components are damaged or not
= Dial tone
No
Yes
OK

4.2 CO Ring detection check



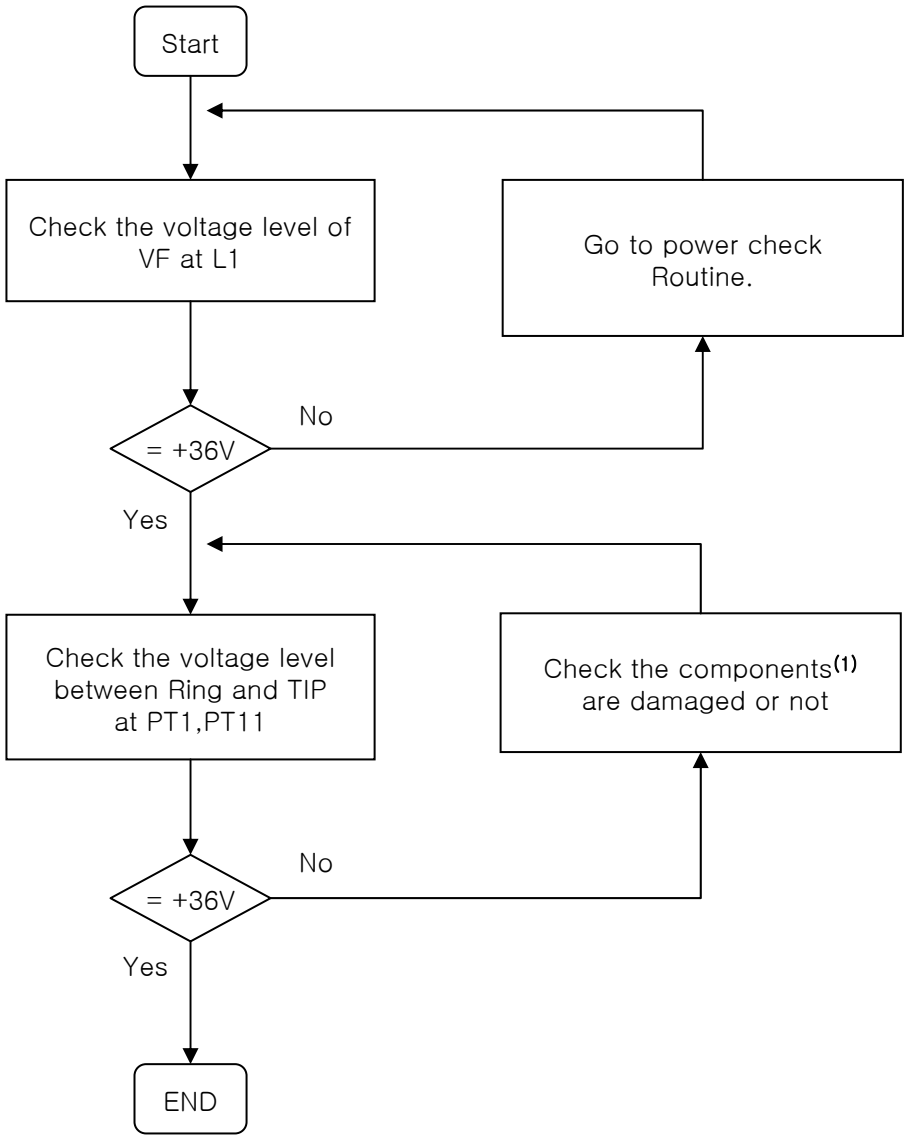
※ Note
(1) C101, R111, RL4, BD1, ZD11, ZD12, Q11, Q12, R121, R122
(2) C102, R113, RL5, BD2, ZD13, ZD14, Q13, Q14, R123, R124



※ Note
C103, R115, ZD15, ZD16, BD3, Q15, Q16, R125, R126

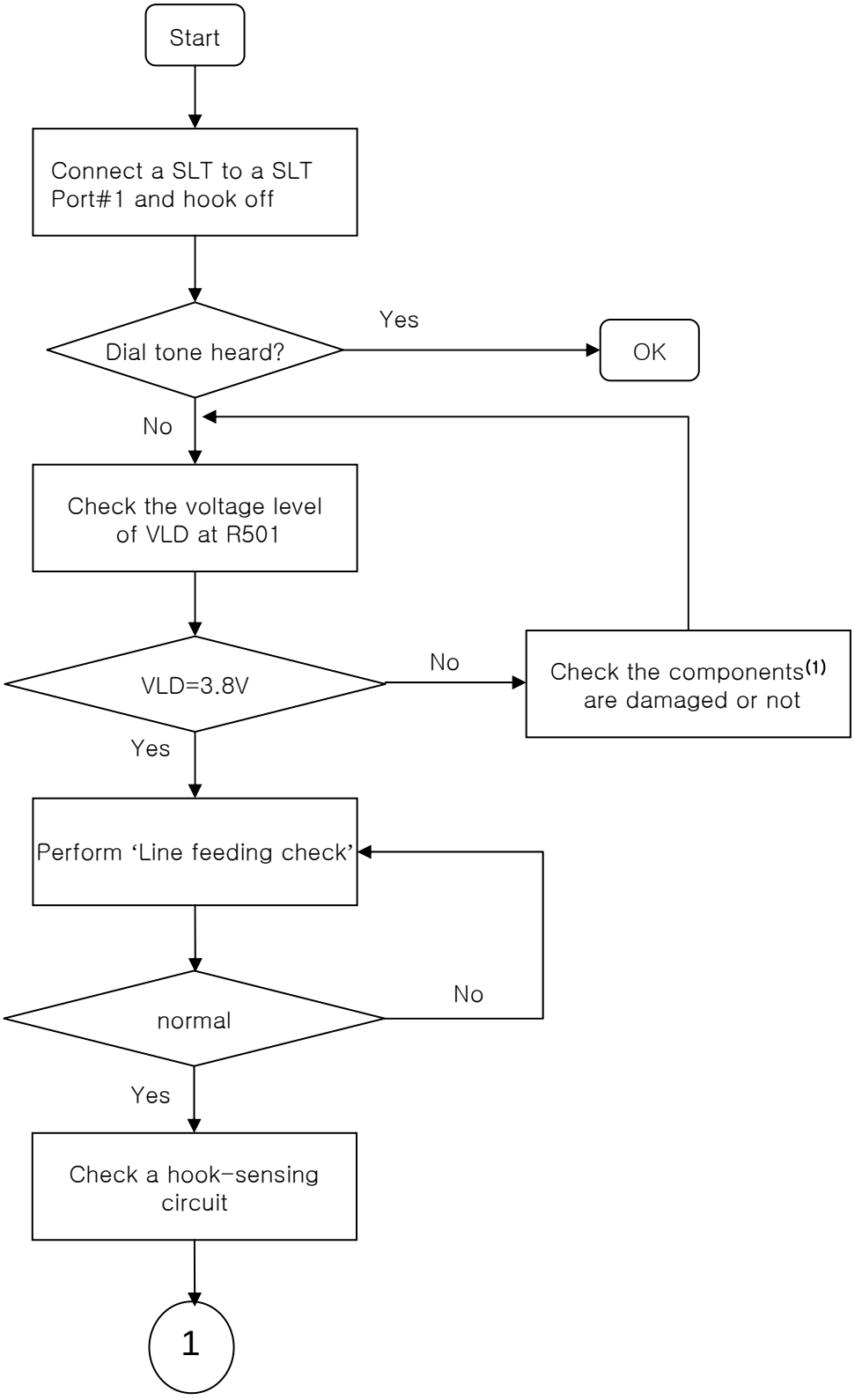
4.3 SLT interface circuit(1st port)

1) SLT Line feeding voltage(+36V) check

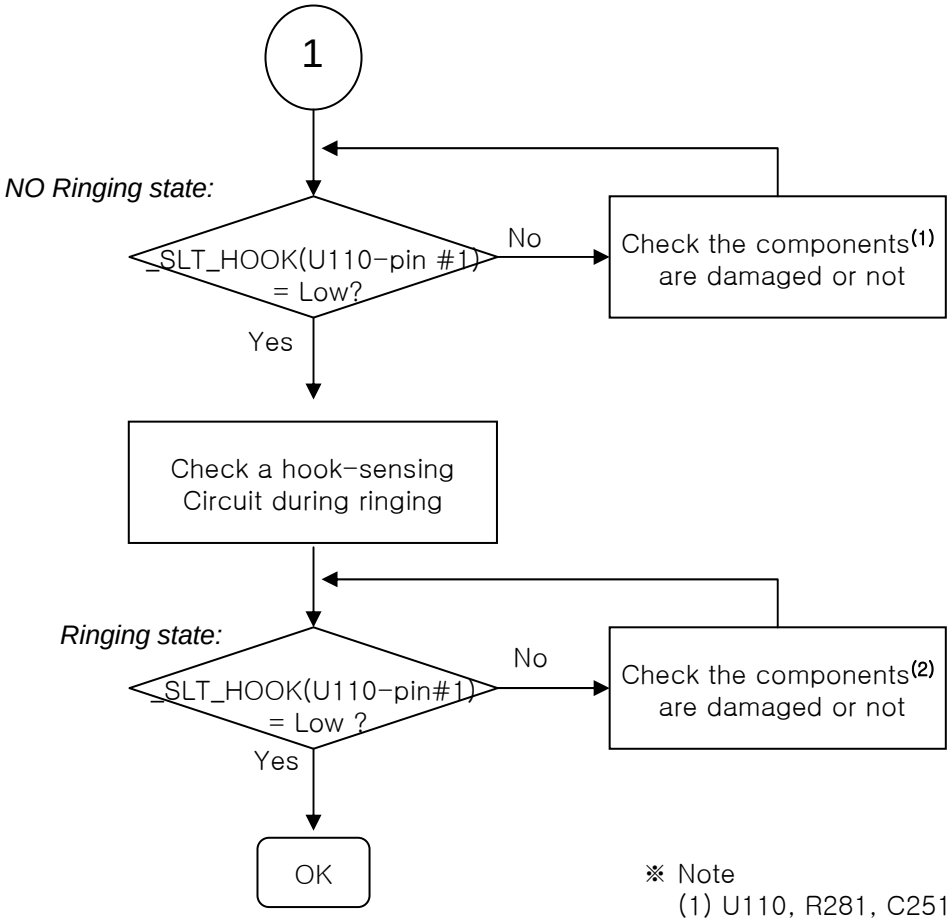


※ Note
(1) Q21, C241, R251, R261, Q31, R301, R311, R331, RL11,R201,R211

2) Hook-sensing check

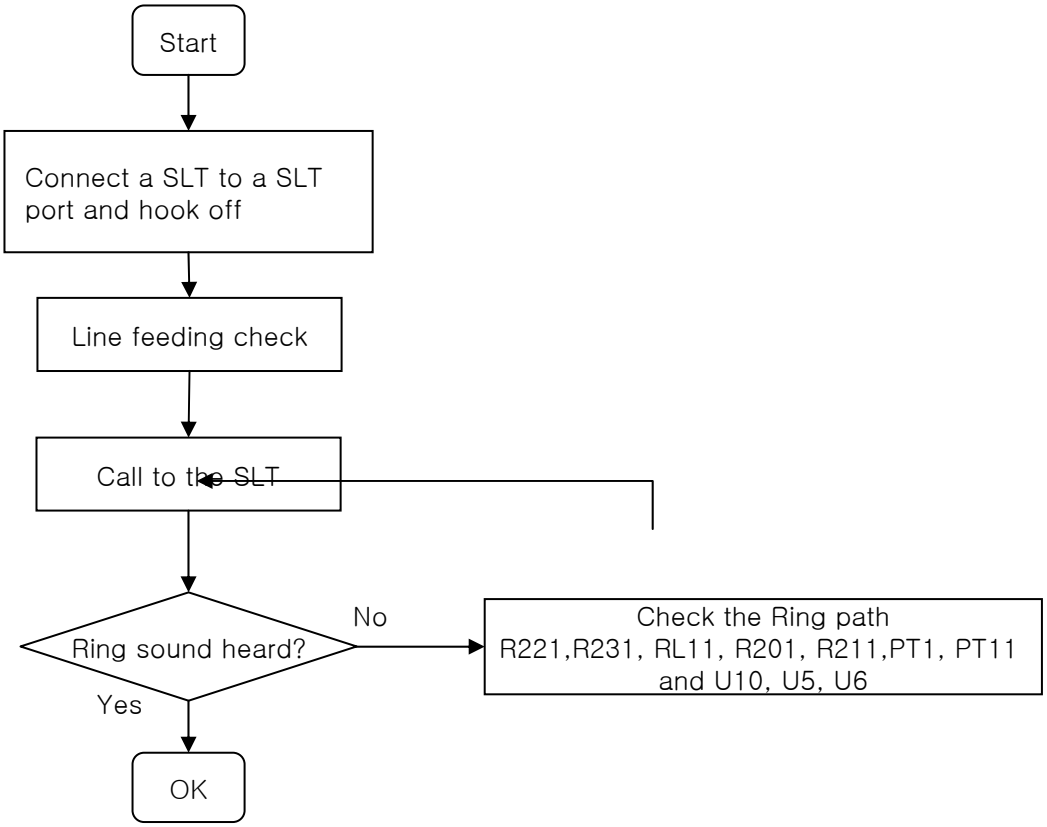


※ Note
(1) U110, R291,R281,C251,R501,R503

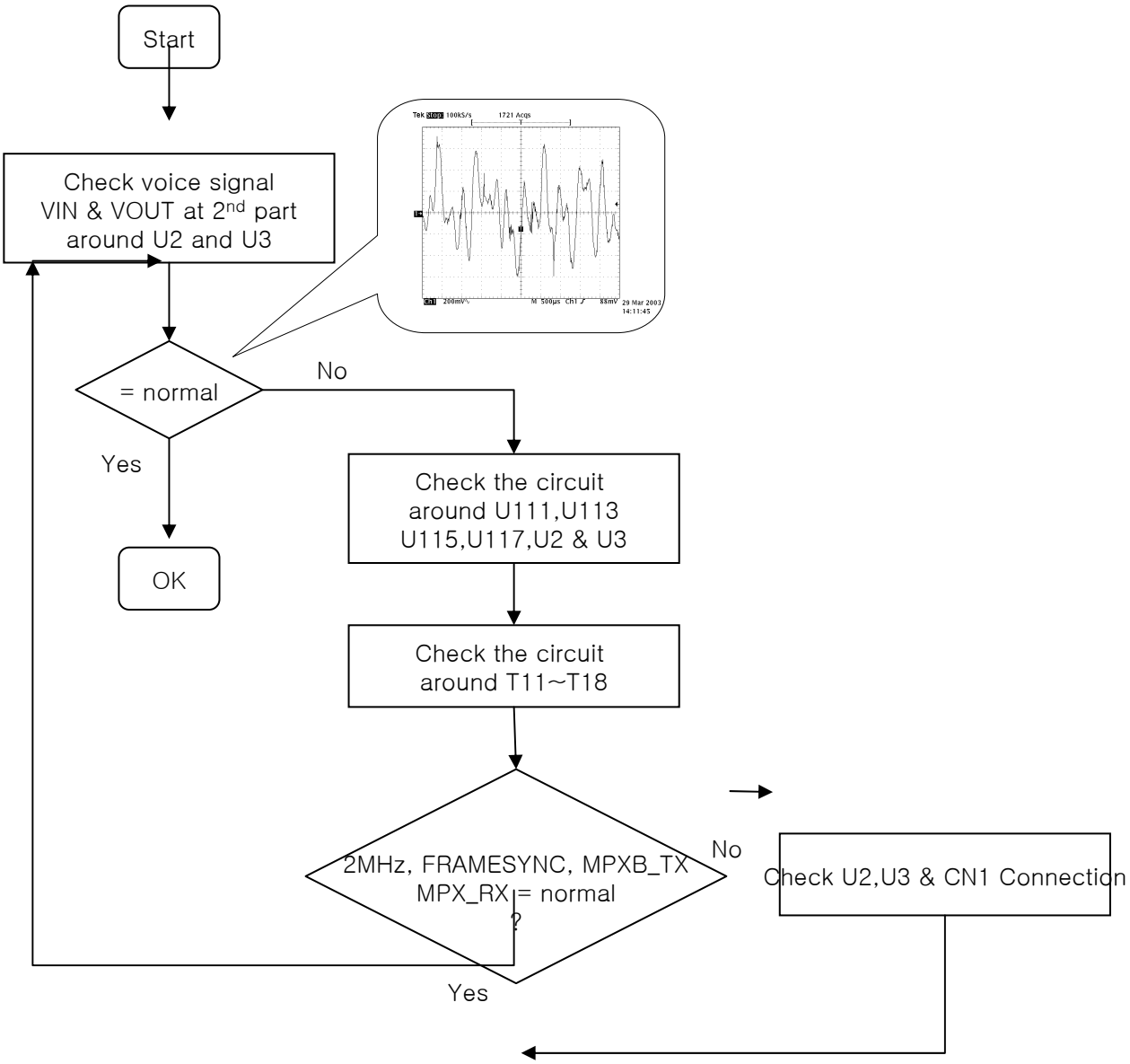


※ Note
(1) U110, R281, C251
(2) R221, R231, R291, C221, D21

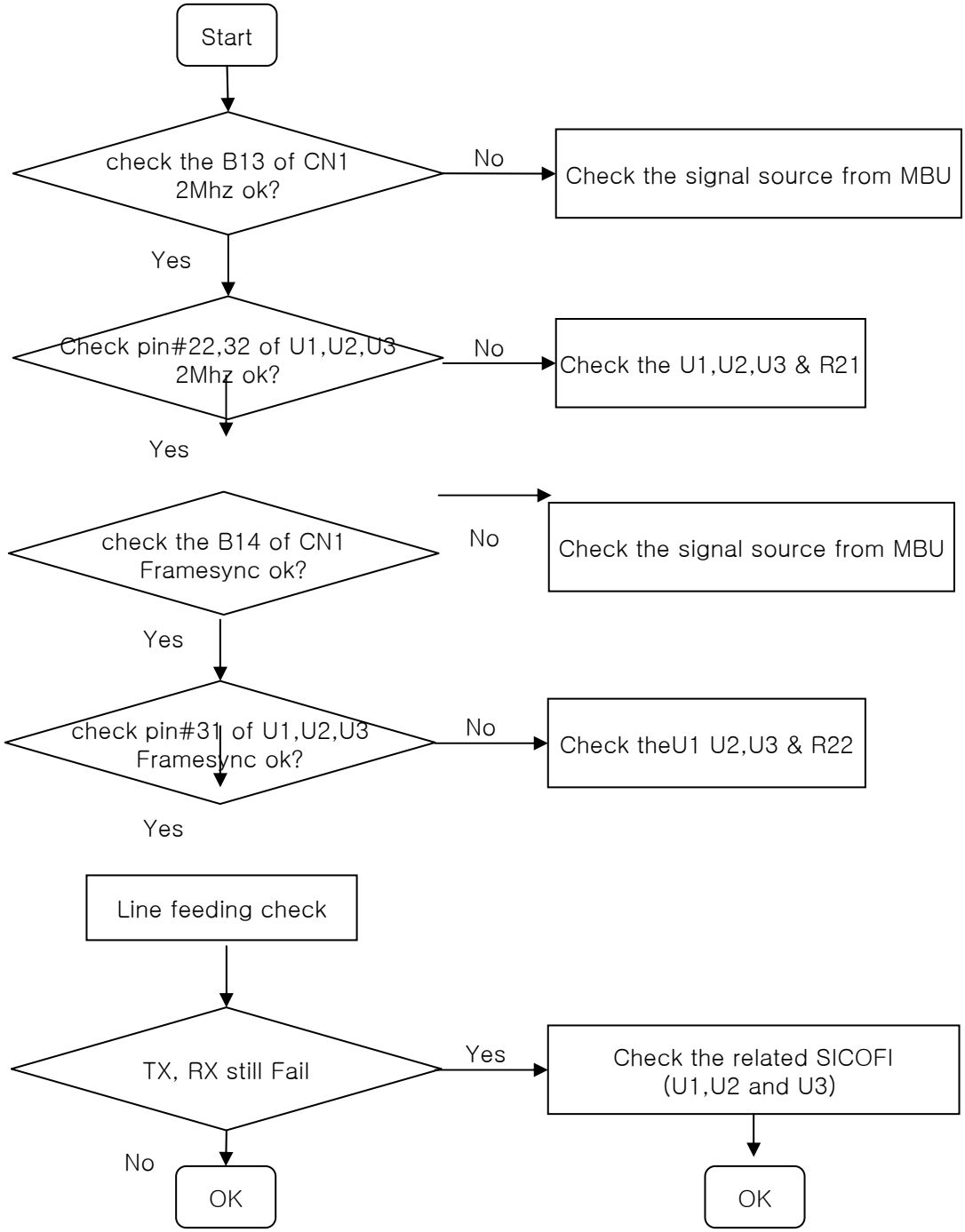
3) SLT Ring path check



4) SLT Voice path check



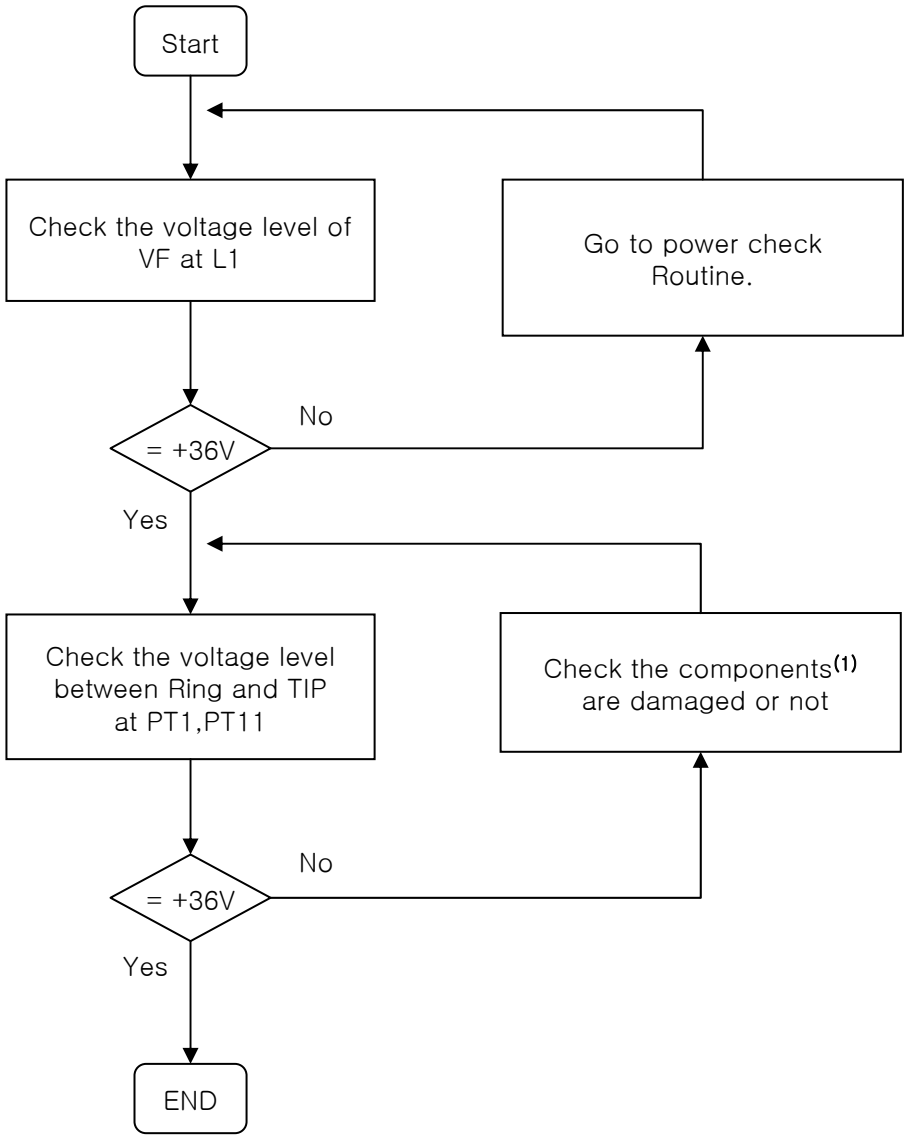
4.4 Rx or Tx Fail



5. SLIB8

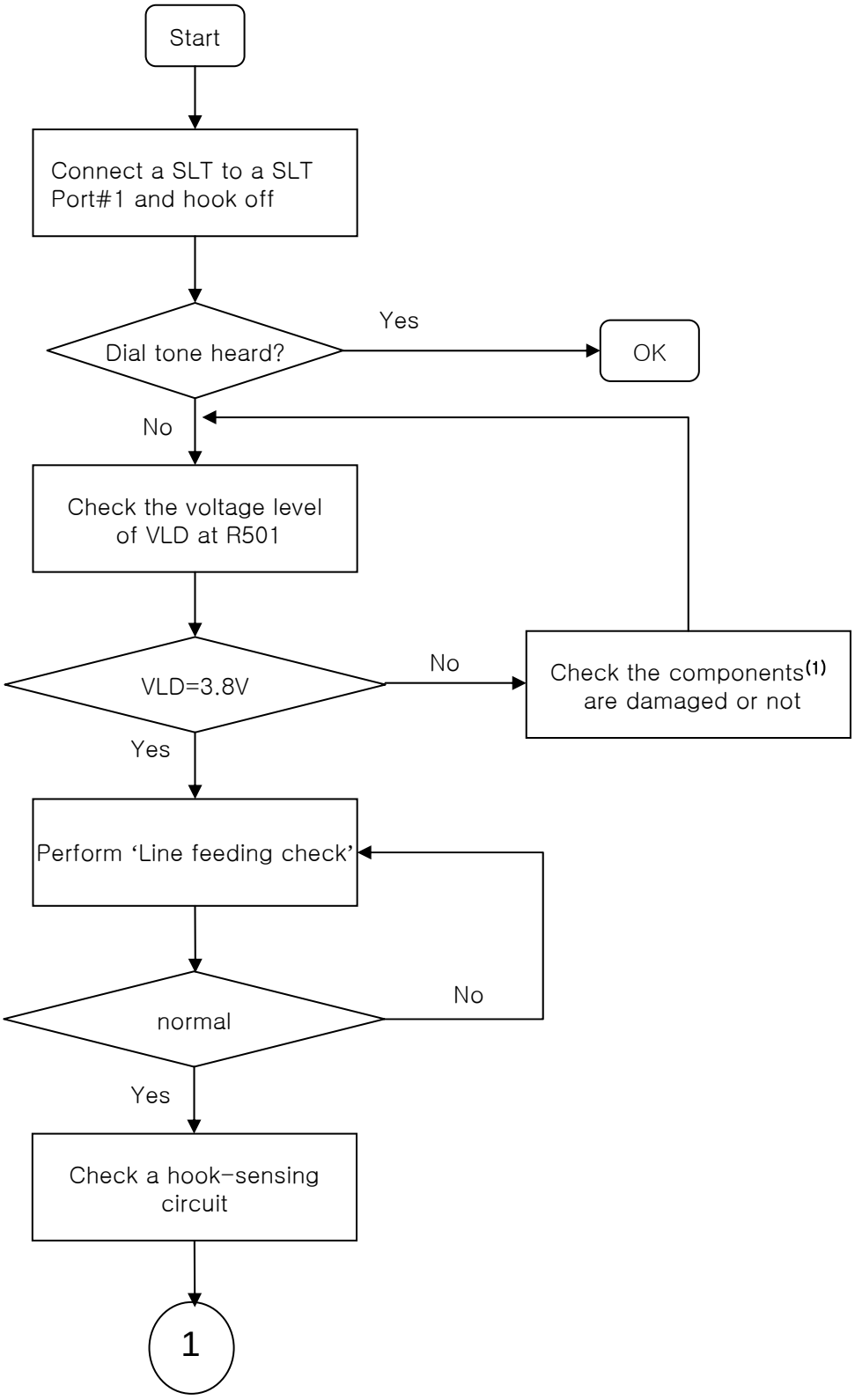
5.1 SLT interface circuit(1st port)

1) SLT Line feeding voltage(+36V) check

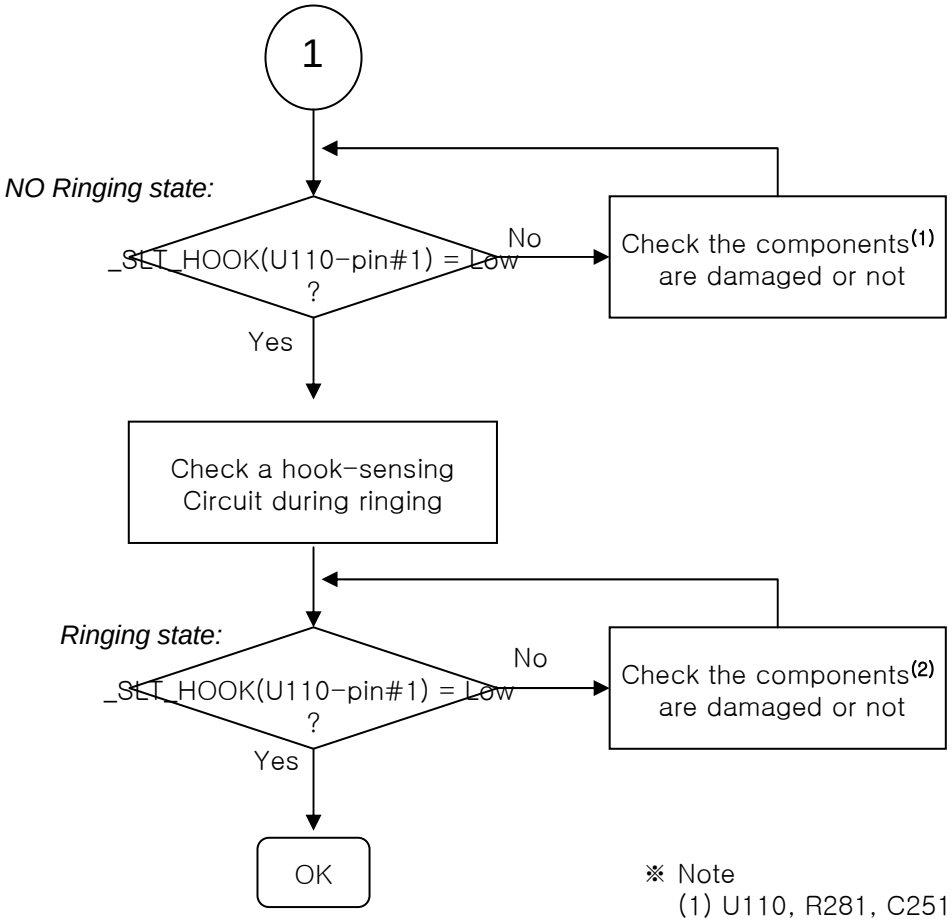


※ Note
(1) Q21, C241, R251, R261, Q31, R301, R311, R331, RL11,R201,R211

2) Hook-sensing check

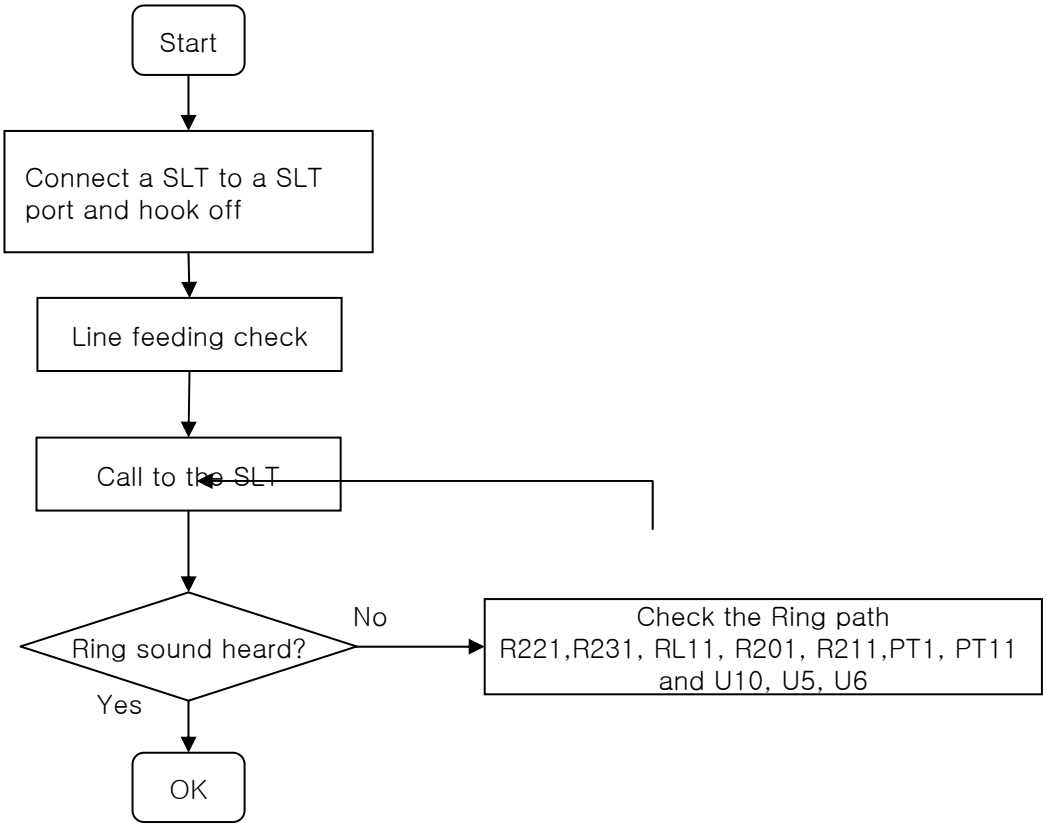


※ Note
(1) U110, R291,R281,C251,R501,R503

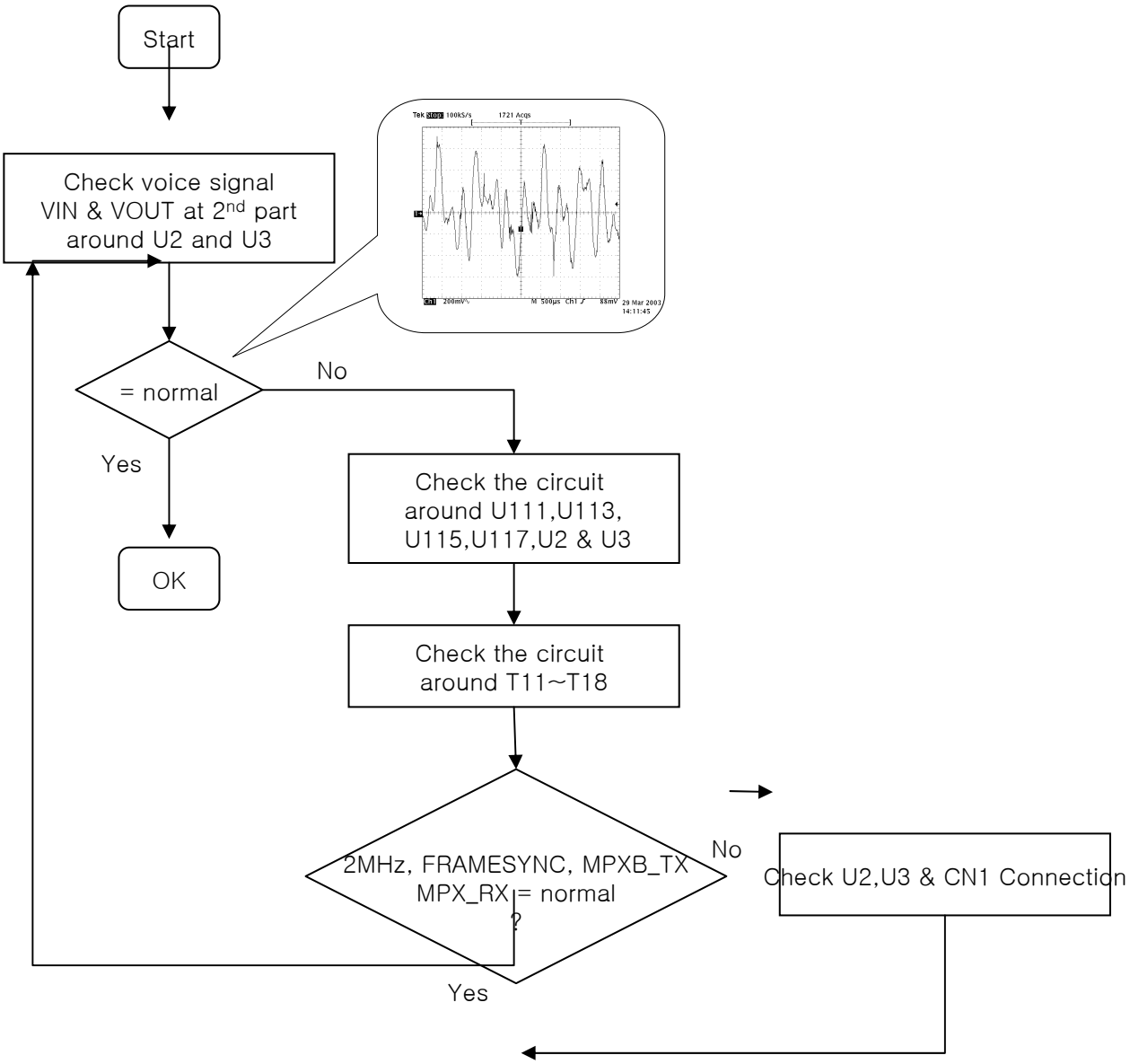


※ Note
(1) U110, R281, C251
(2) R221, R231, R291, C221, D21

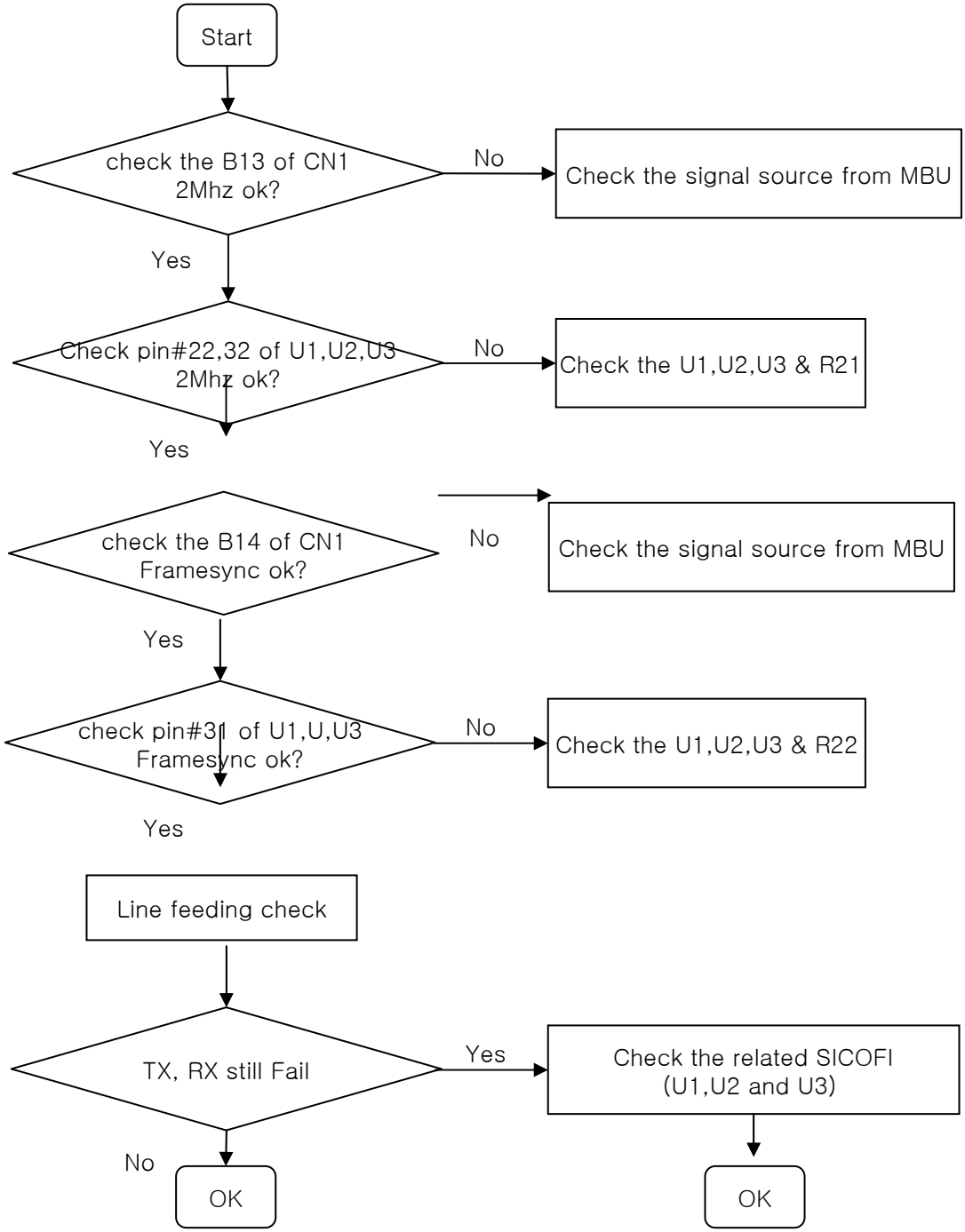
3) SLT Ring path check



4) SLT Voice path check



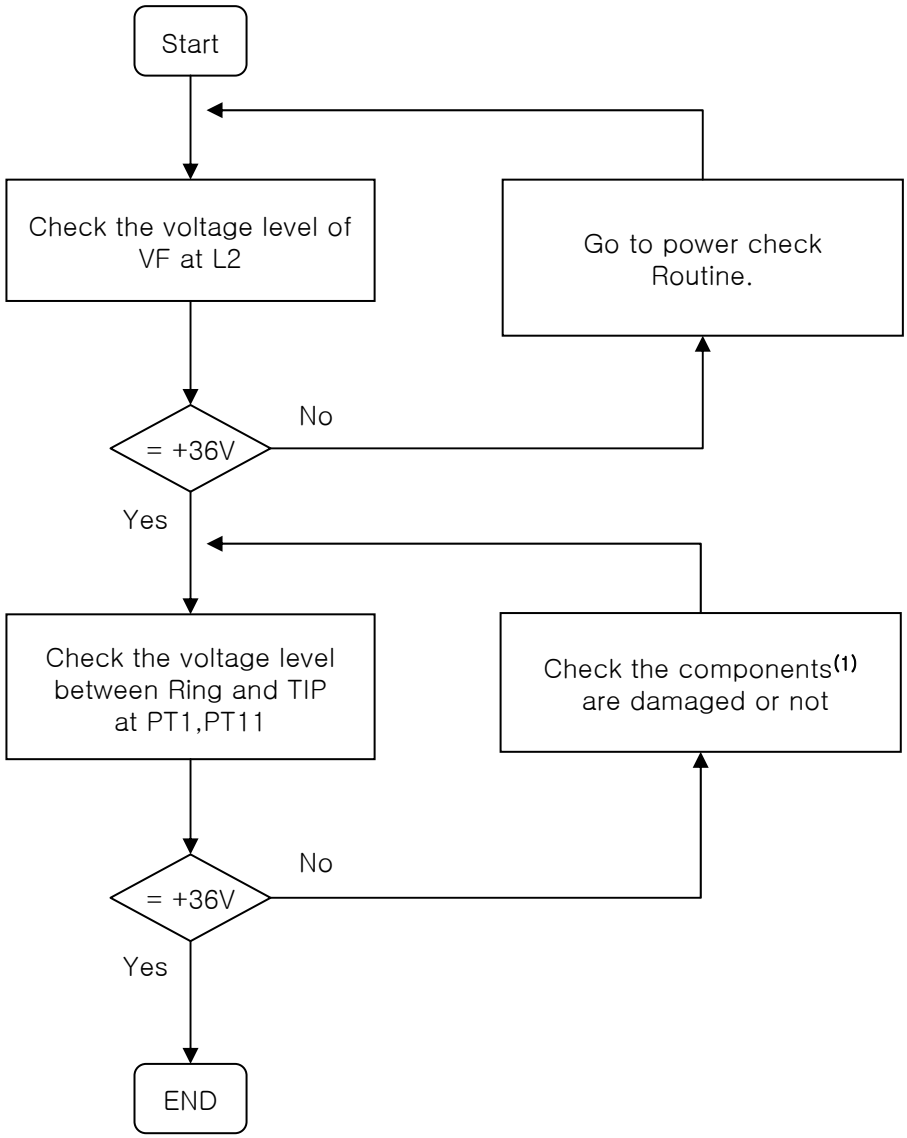
5.2 Rx or Tx Fail



6. SLU8

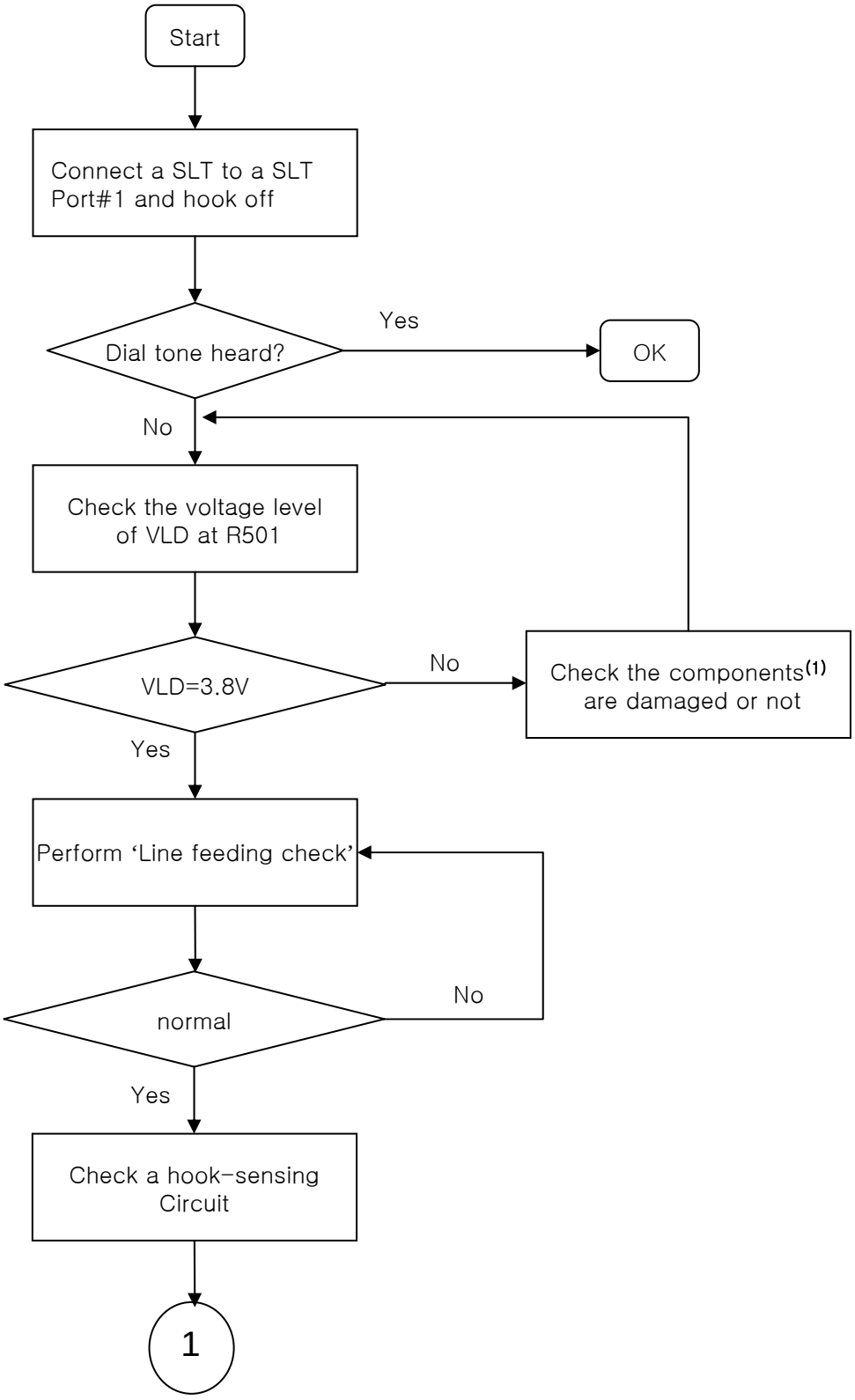
6.1 SLT interface circuit(1st port)

1) SLT Line feeding voltage(+36V) check

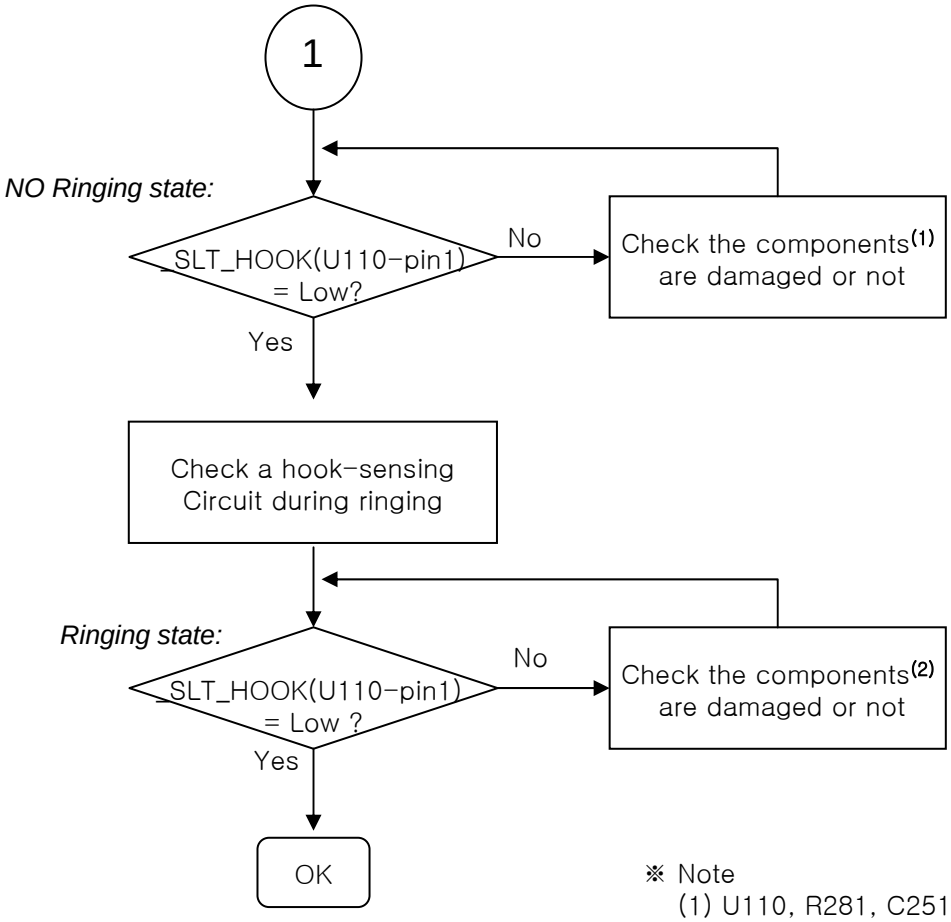


※ Note
(1) Q21, C241, R251, R261, Q31, R301, R311, R331, RL11,R201,R211

2) Hook-sensing check

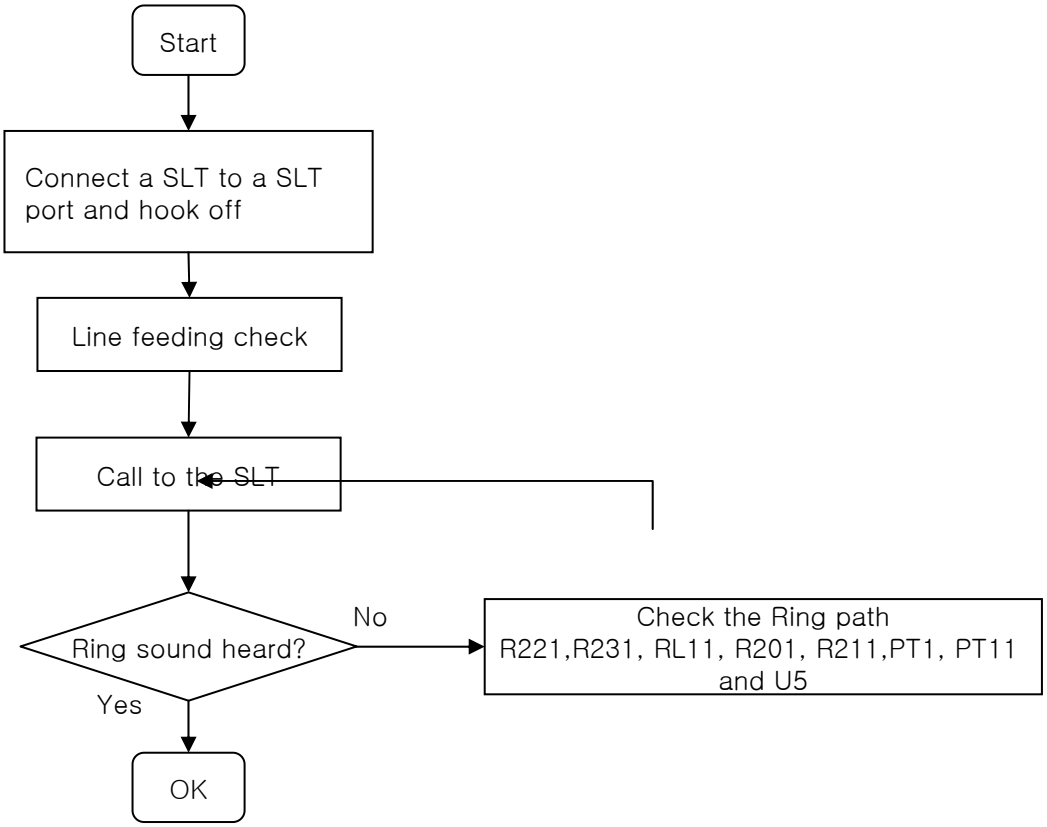


※ Note
(1) U110, R291,R281,C251,R501,R503

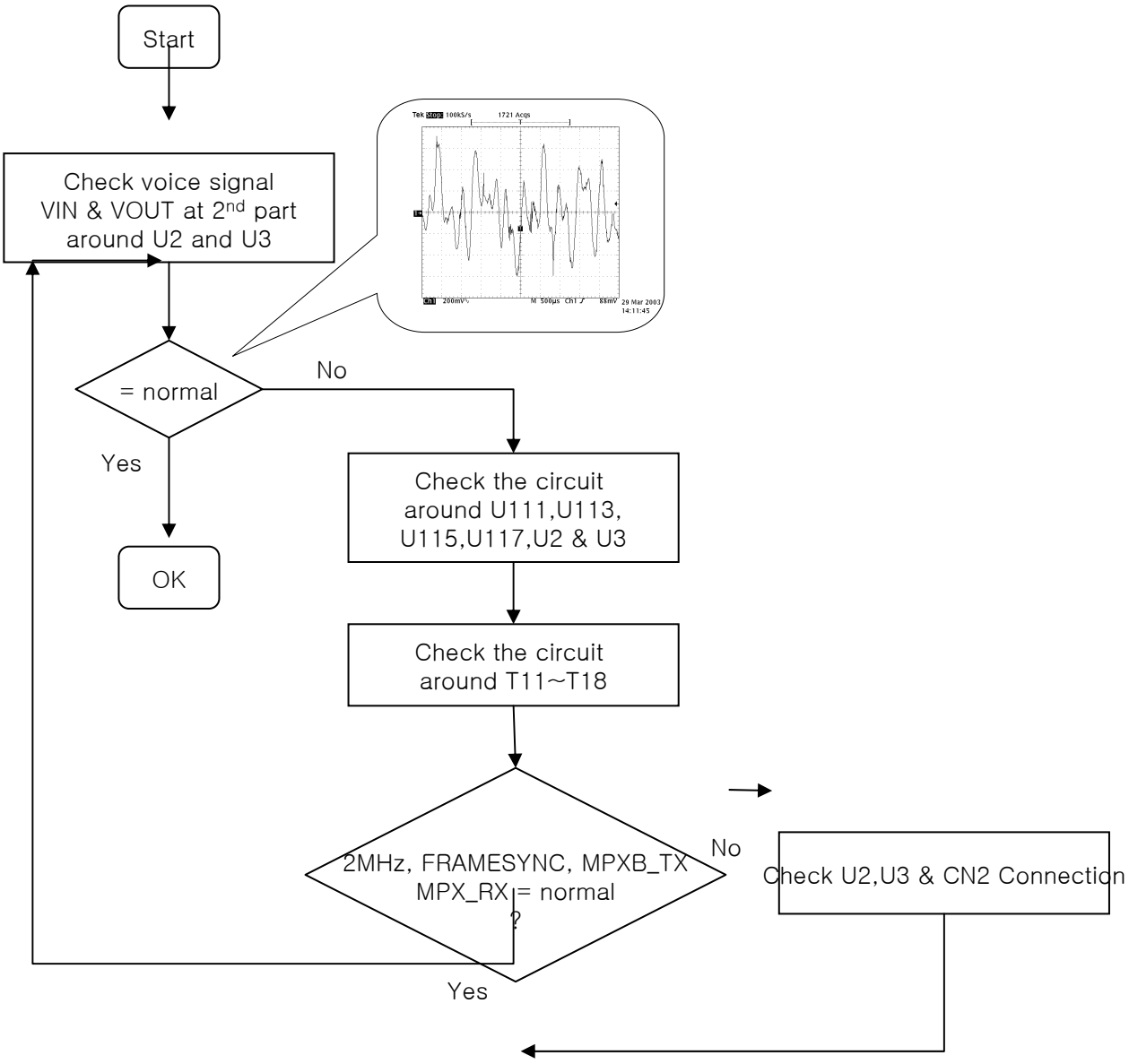


※ Note
(1) U110, R281, C251
(2) R221, R231, R291, C221, D21

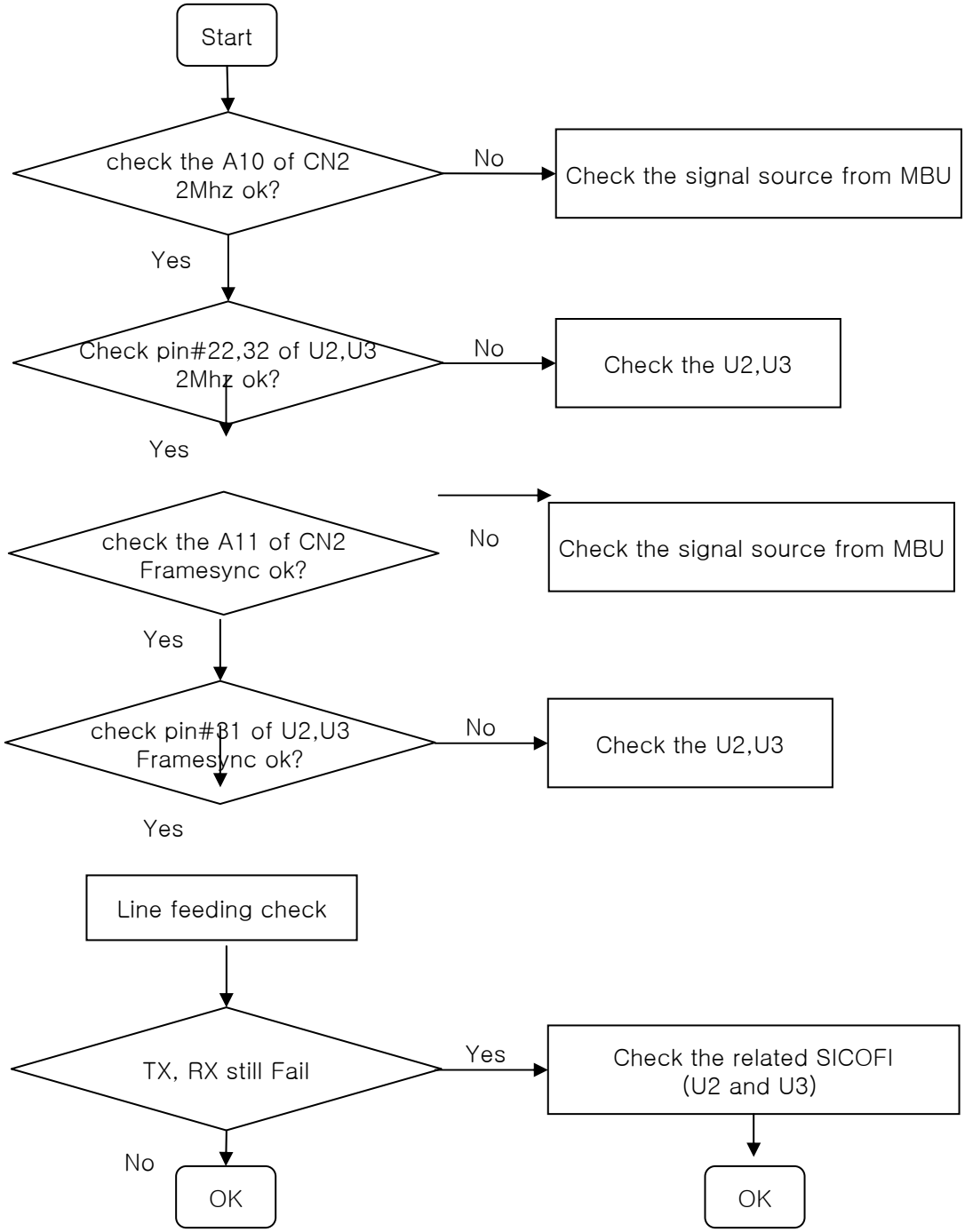
3) SLT Ring path check



4) SLT Voice path check

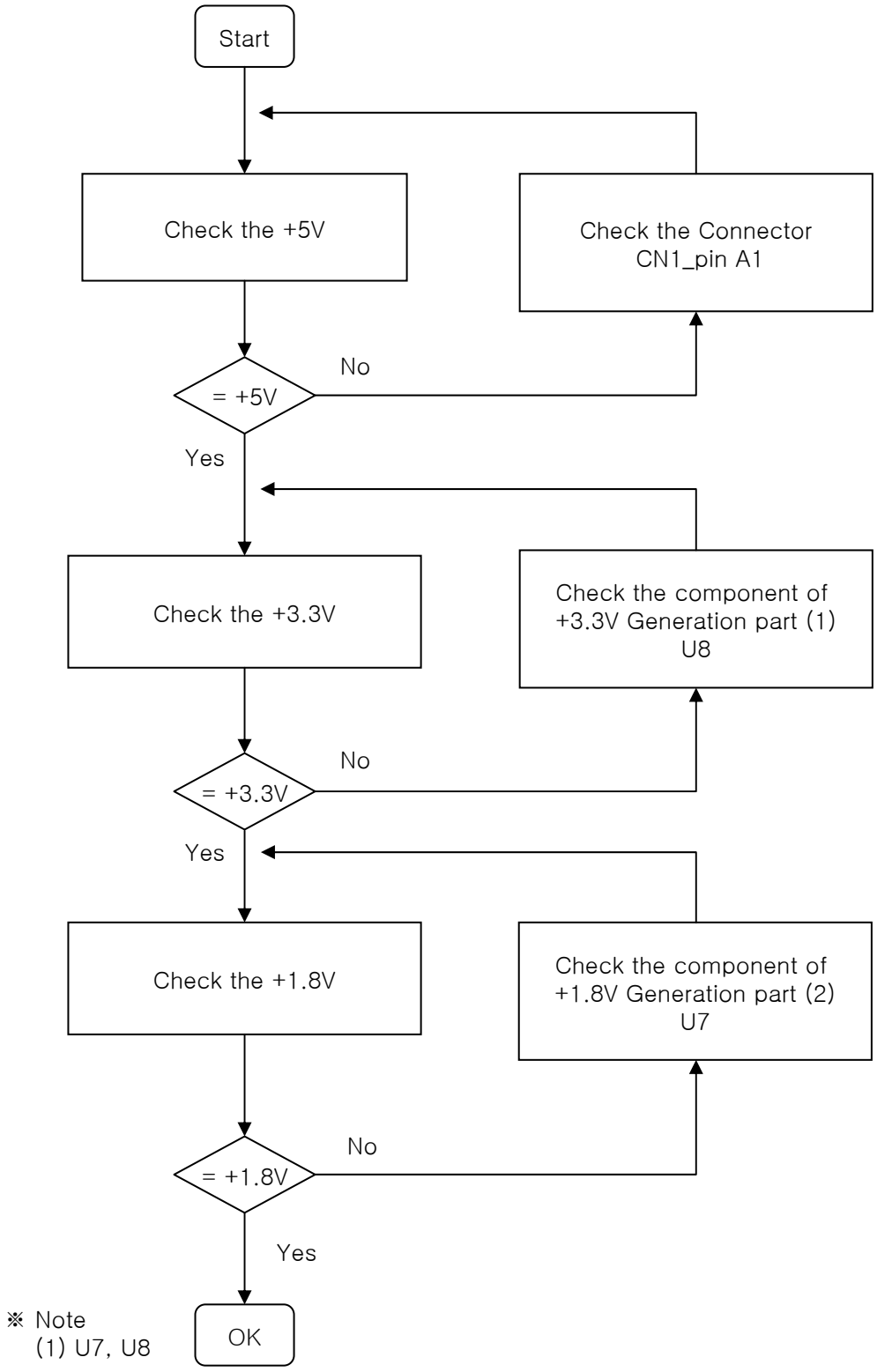


6.2 Rx or Tx Fail

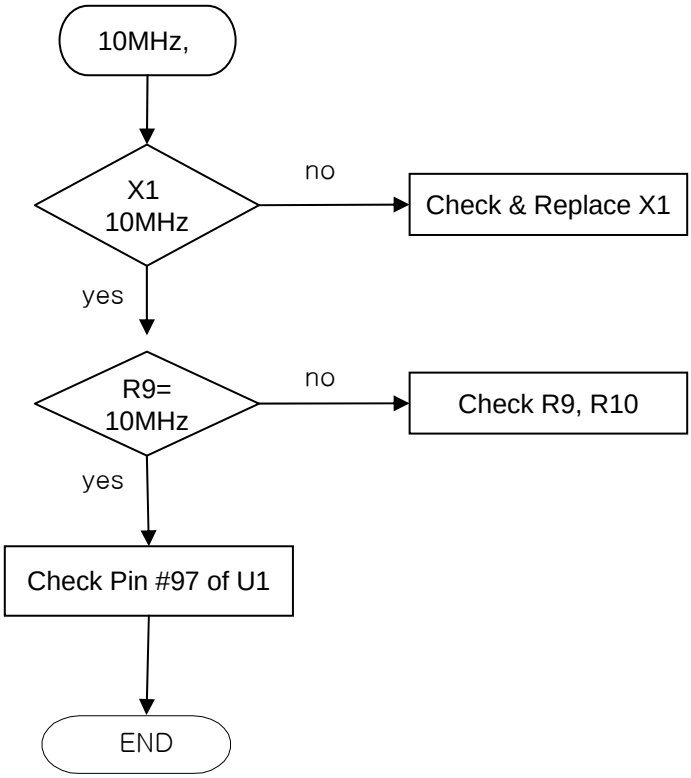


7. VMIU/AAFU

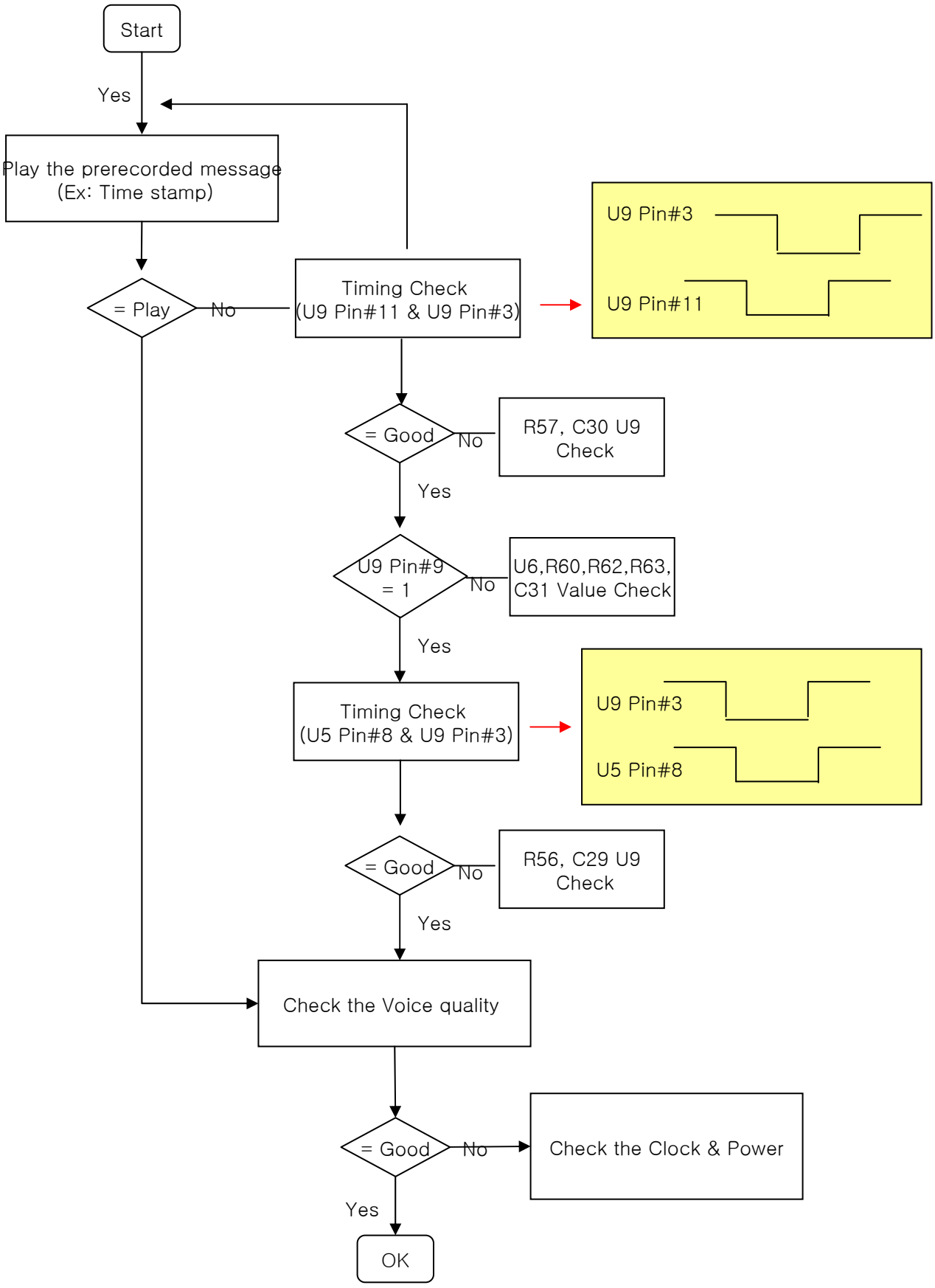
7.1 Power status



7.2 Clock Check (10MHz)

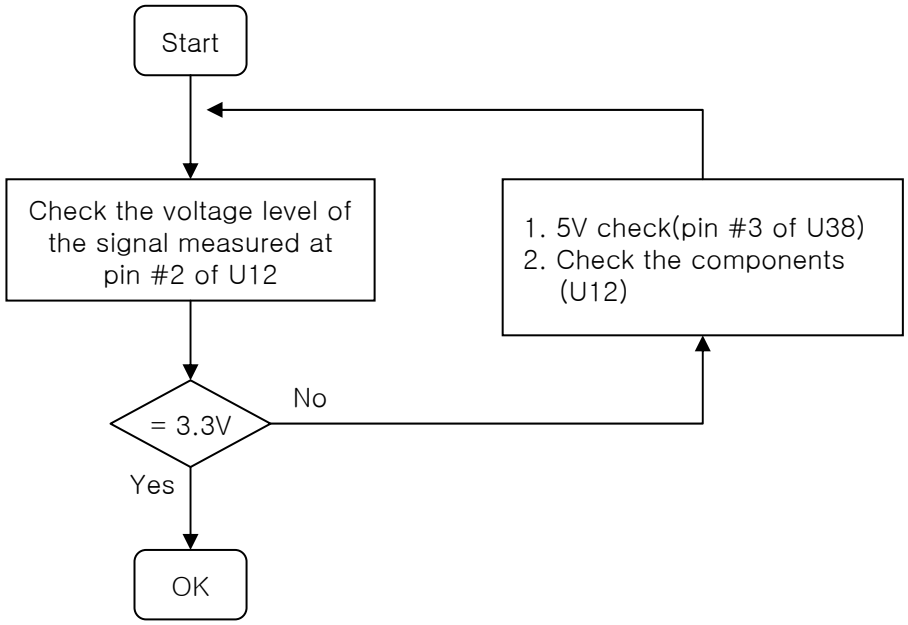


7.3 Play/Record status

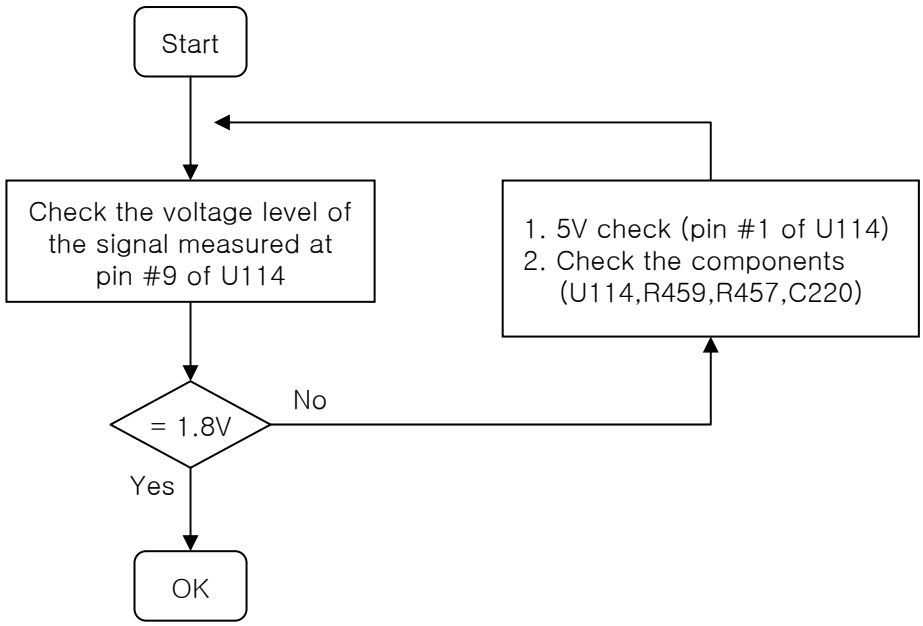


8.VOIB

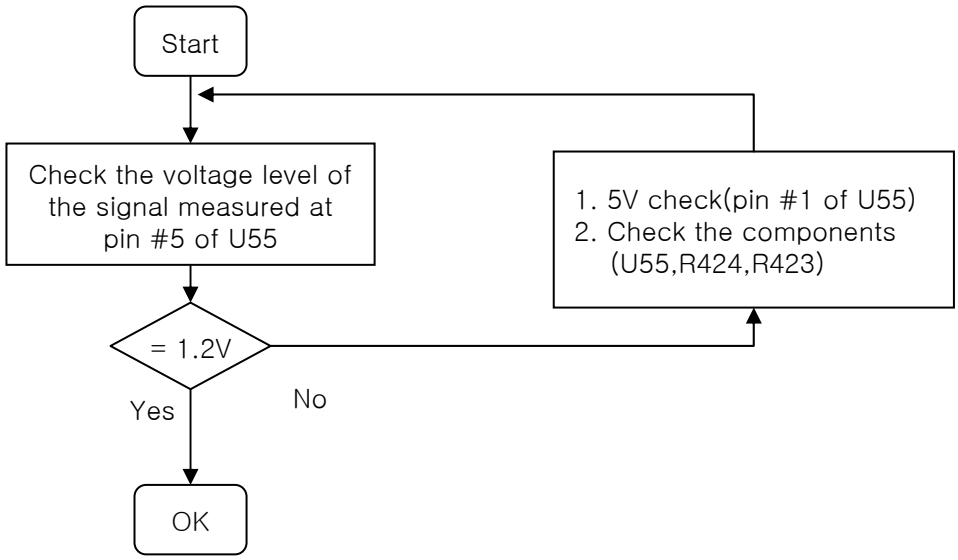
8.1 3.3V check



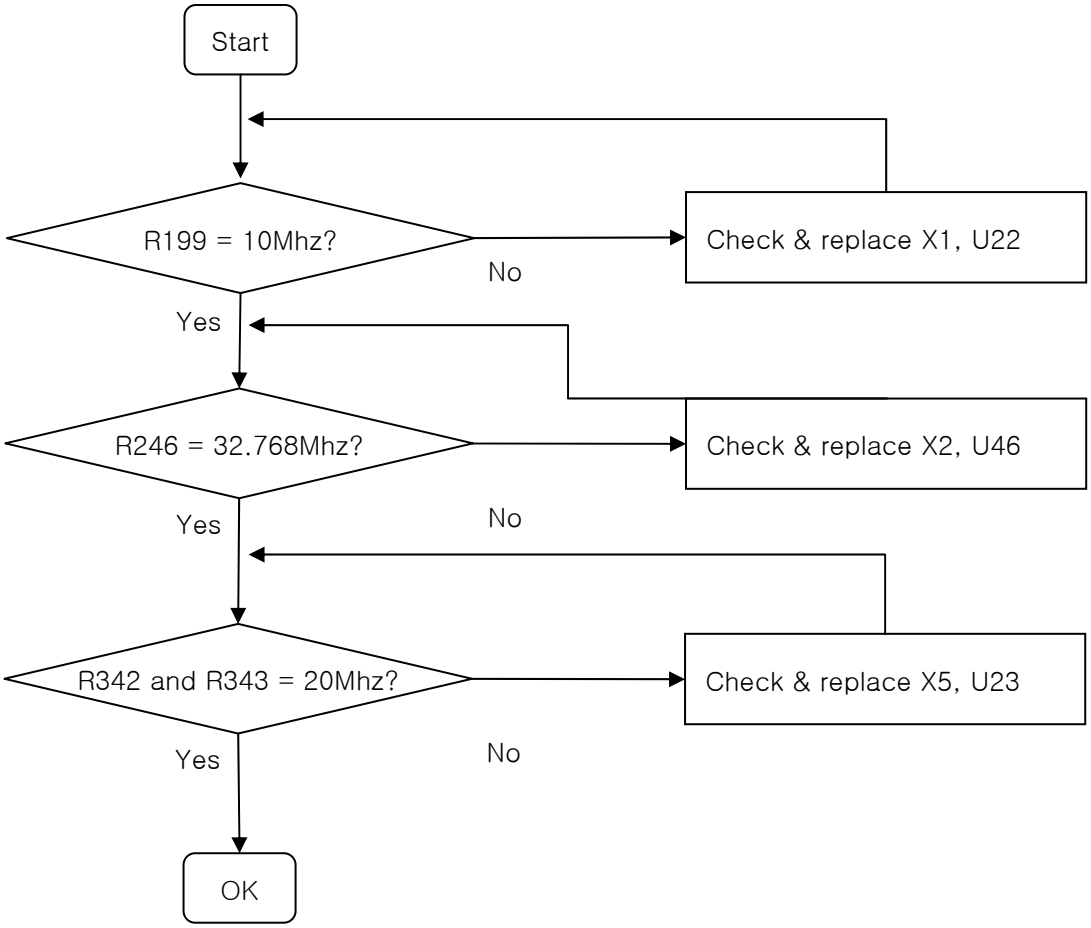
8.2 1.8V check



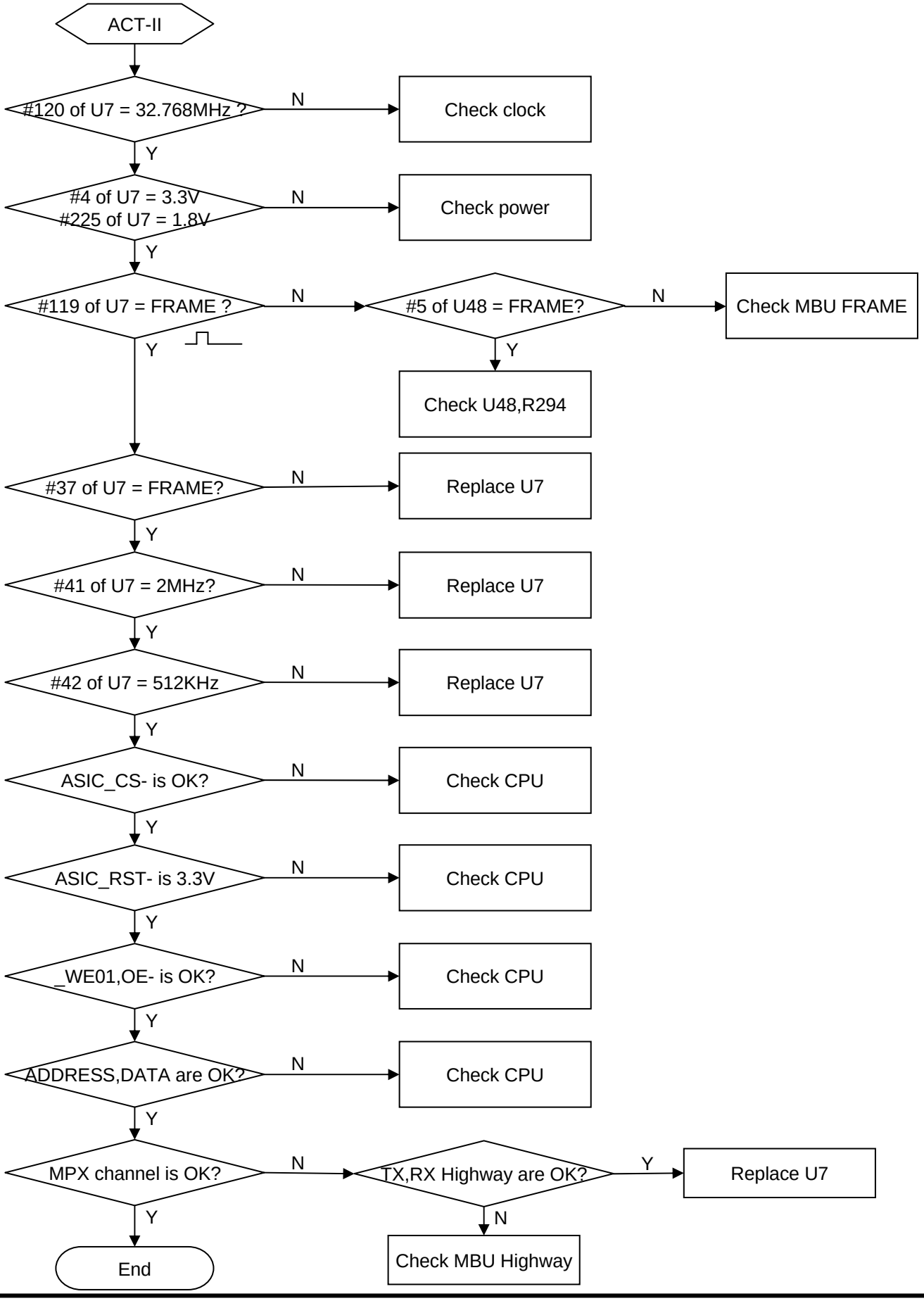
8.3 1.2V check



8.4 Clock check



8.5 ACT-II check



9. E1HB (PRHB8)

Sheet */* means page number of circuit diagram.

9.1 E1HB8(PRHB8): E1R2 & 8 Hybrid interface Board

9.1.1 Power check from MBU(VO = +30V, +5V, -5V)

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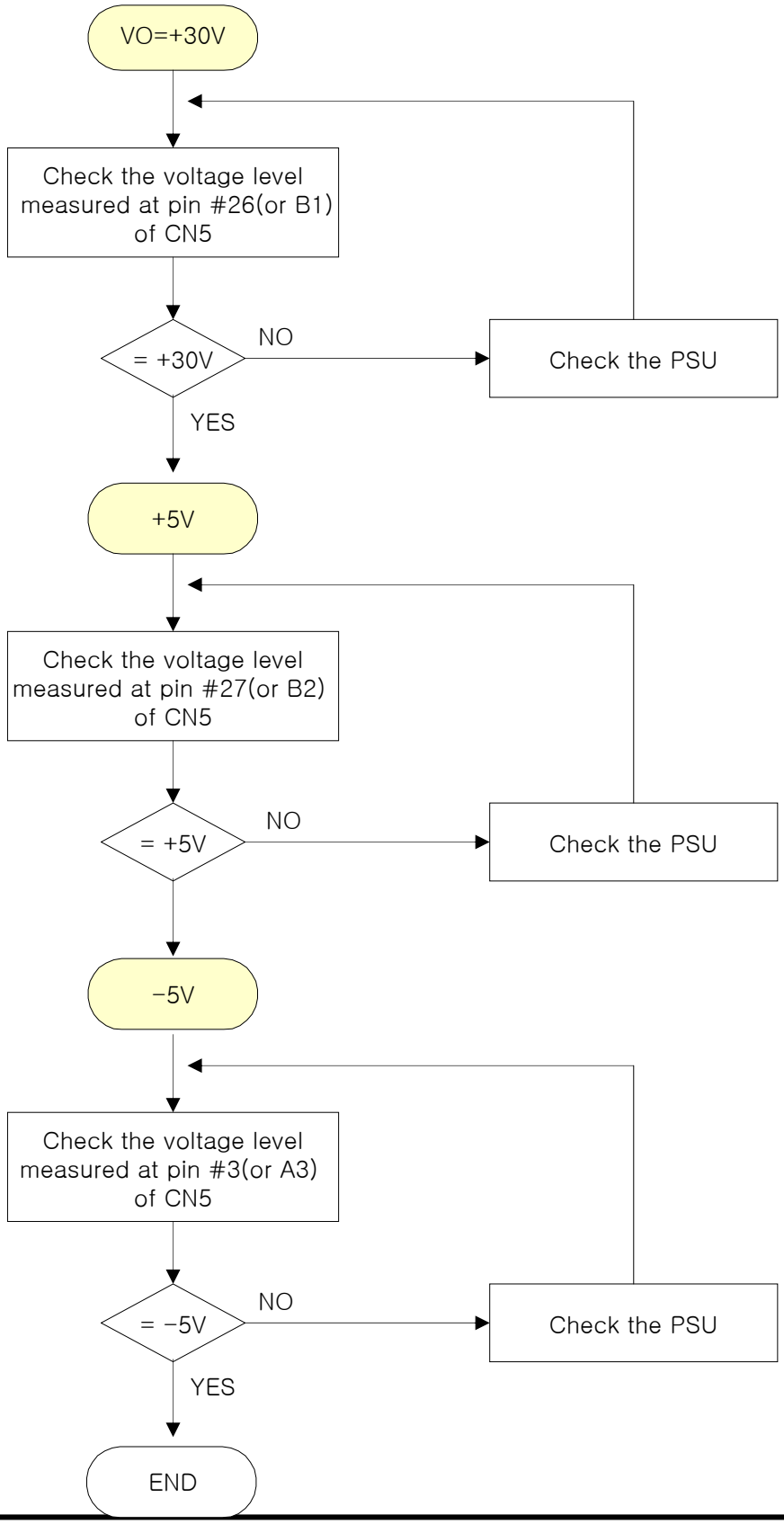
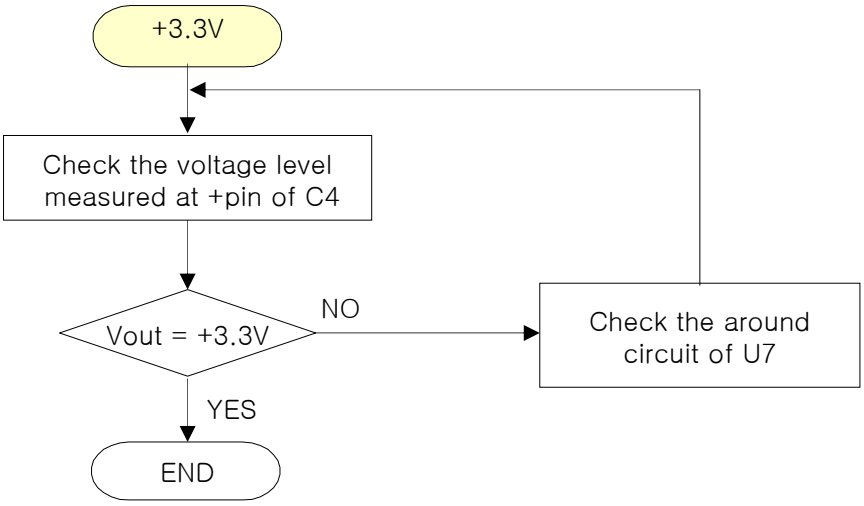


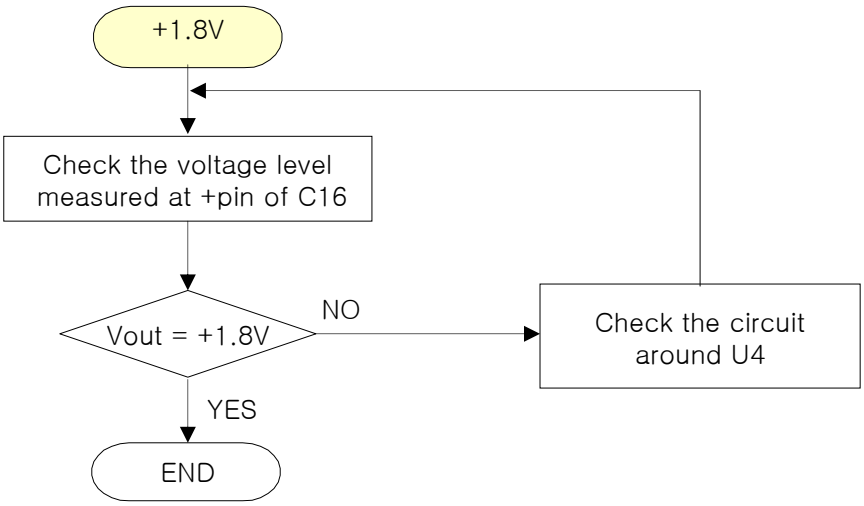
9.1.2 +3.3V Power Status

Sheet 4/7



9.1.3 +1.8V Power Status

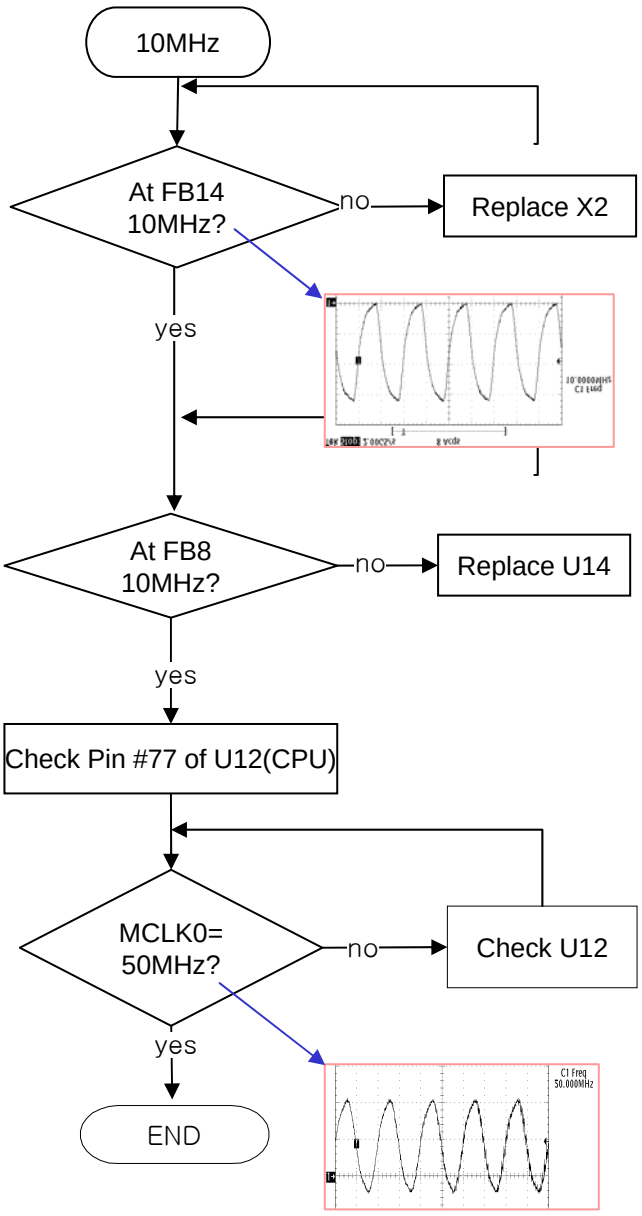
Sheet 4/7



[NOTE] U4(NCP1117ST18): +1.8V regulator
U7(EZ1587CM-3.3): +3.3V regulator

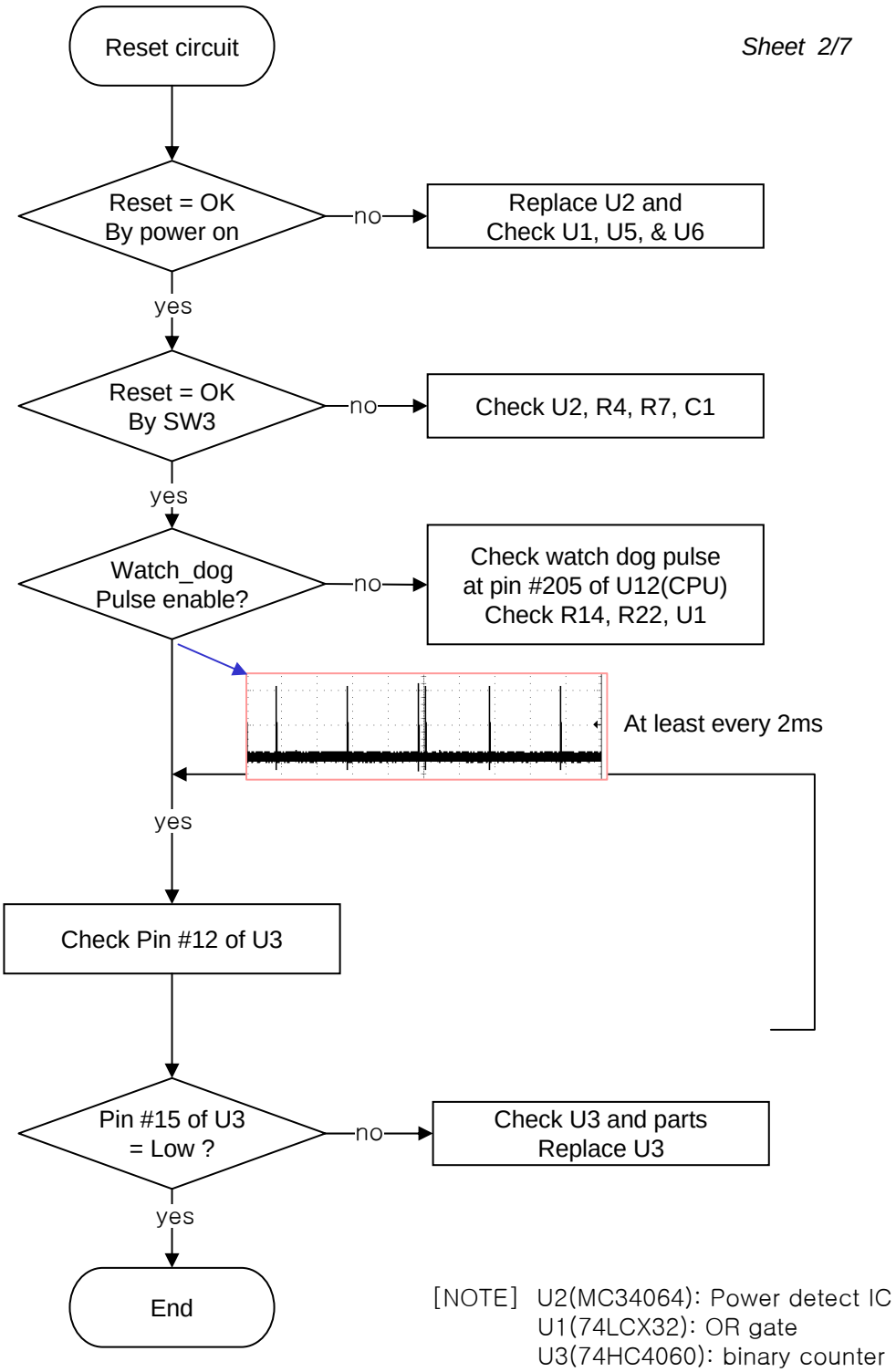
9.1.4 Clock Check (10MHz)

Sheet 1/7



[NOTE] U12(S3C4530A): ARM7 CPU
U14(FS781): clock driver

9.1.5 Reset circuit

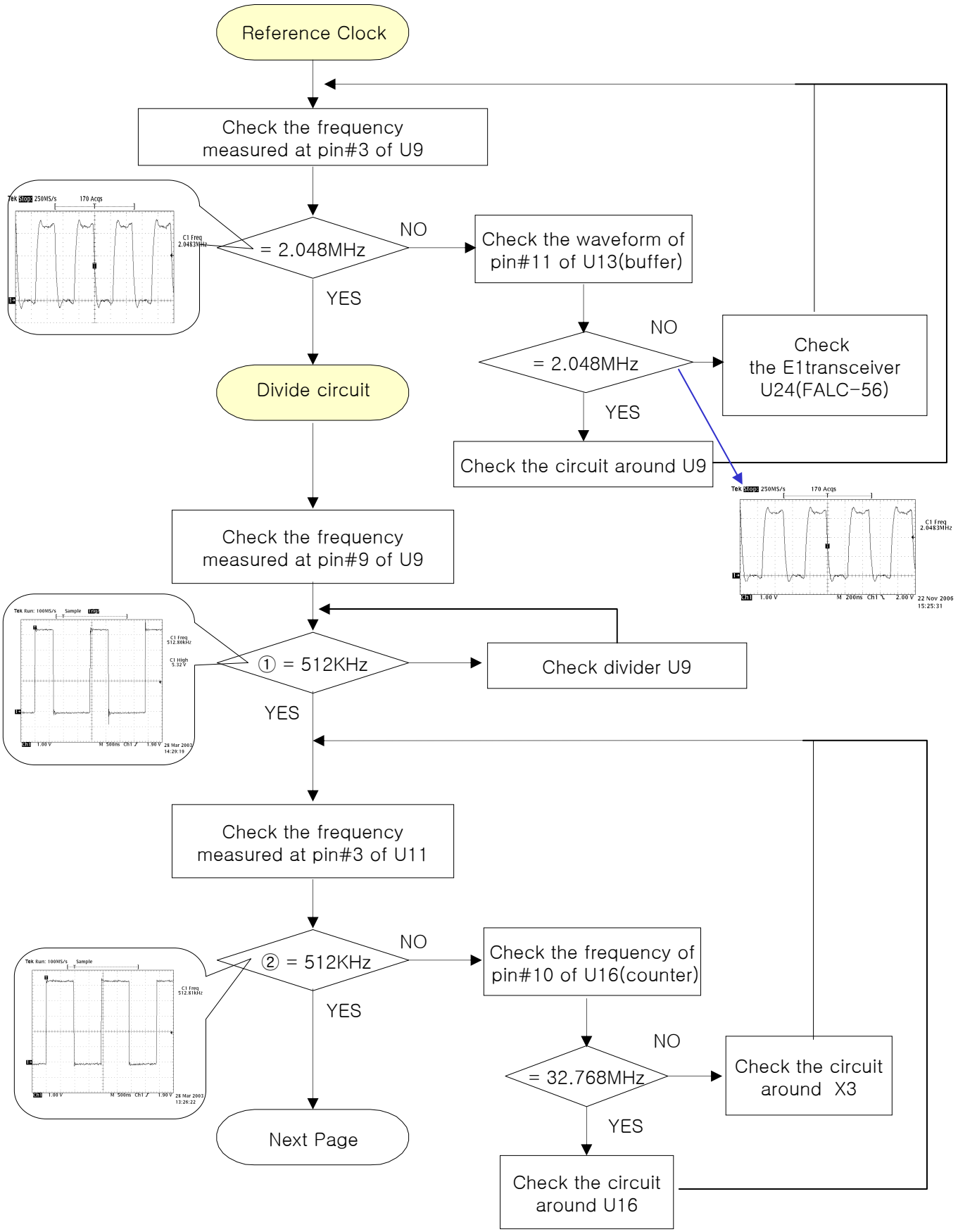


[NOTE] U2(MC34064): Power detect IC
U1(74LCX32): OR gate
U3(74HC4060): binary counter
U5(74LCX08): AND gate
U6(74LCX04): Inverter

9.1.6 PLL (Phase Locked Loop) circuit

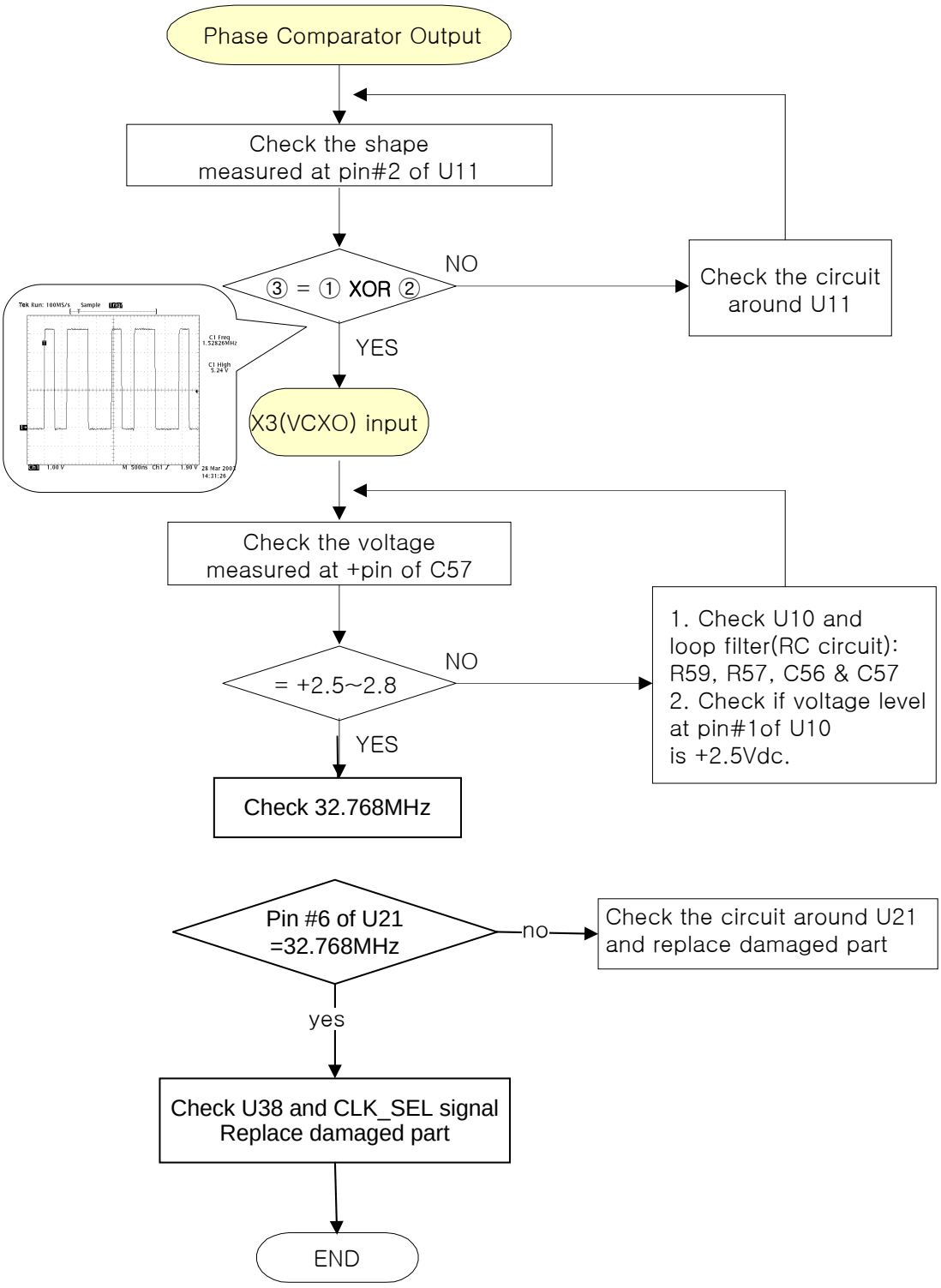
1) PLL circuit check

Sheet 5/7



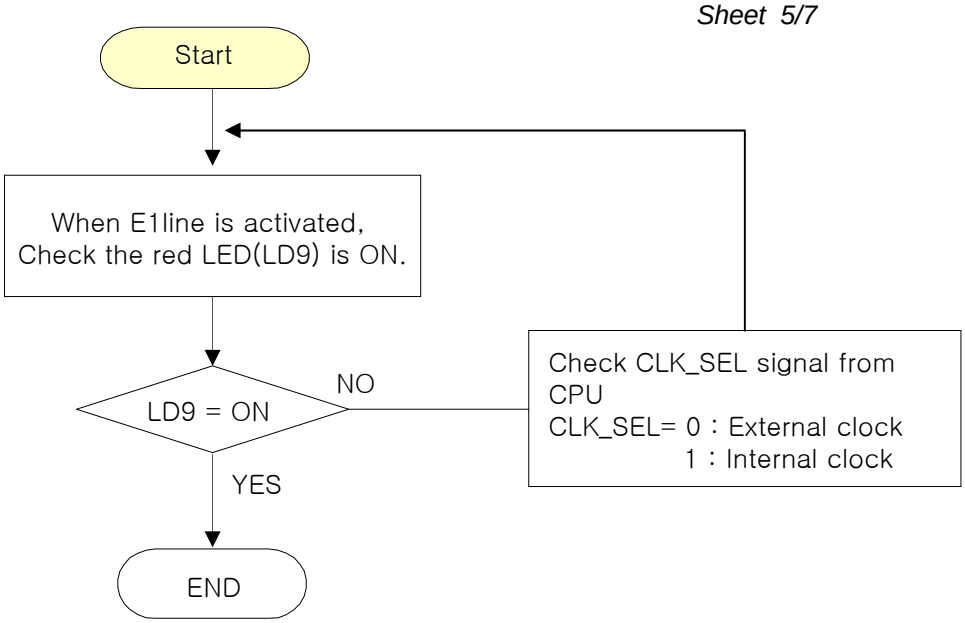
1) PLL circuit check(continued)

Sheet 5/7



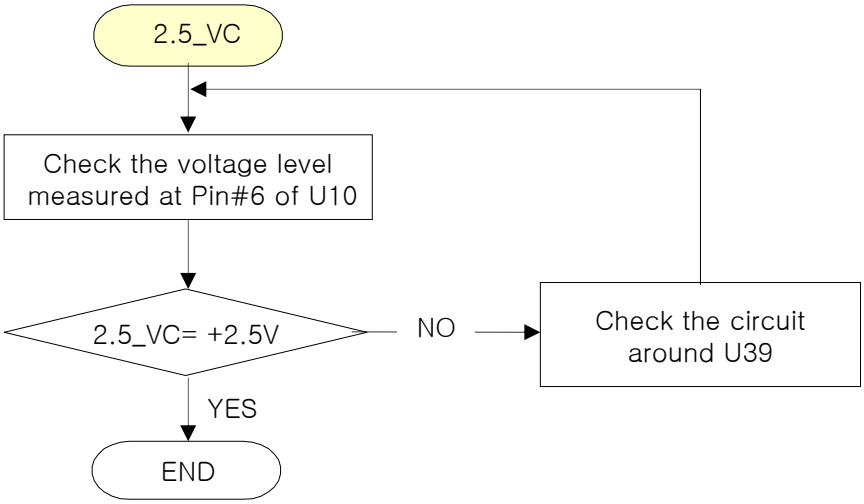
2) Functional check

Sheet 5/7



[NOTE] -. CLK_SEL is clock selection signal from CPU and
selects clock source to internal clock or extracted clock.
-. When E1 line is activated and no errors are detected, extracted clock is selected by control signal of CPU.
-. When internal clock is selected, reference DC voltage,+2.5V,makes VCXO(X3) operate in nominal state.

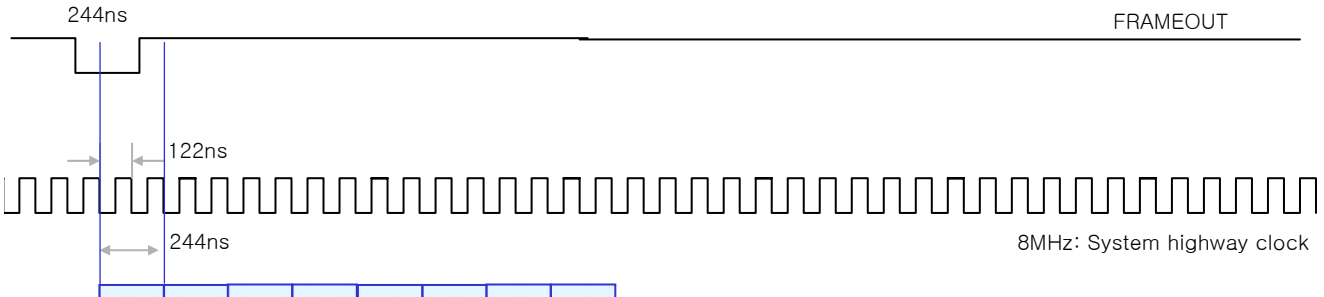
Sheet 5/7



[NOTE] U39(MIC5205-3.0): +3.0V regulator with 1% accuracy
2.5_VC is generated with divide resistors(R784 and R785)

9.1.7 System Highway structure

Sheet 4/11

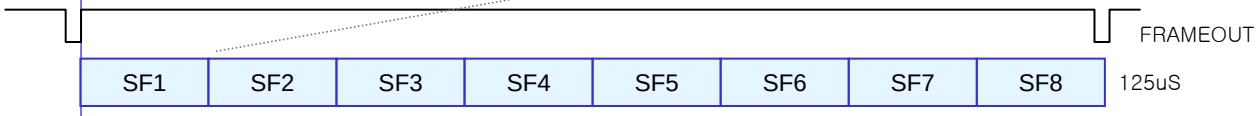


0	1	2	3	4	5	6	7

1 time slot of Highway: 4.098Mbps

0	1	2	3	4	5	6	7
HDLC	D or HDLC	B1	B2	B3	B4	B5	B6

1 sub-frame: 8 time slots(**1HDLC+1D+6B**)

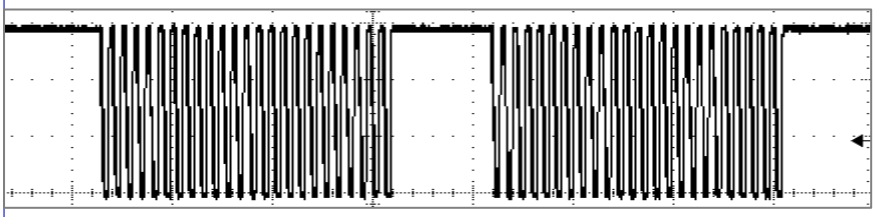


SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8

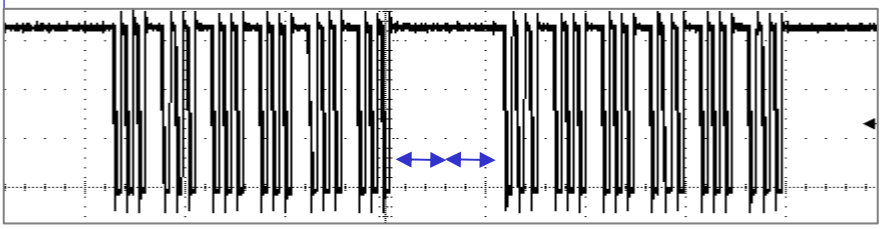
125uS

1 frame: 8 sub-frames(**1HDLC+1D+48B**)

HDLC: 512Kbps or 1024Kbps(when D channel is used as HDLC)
8bits x 8 sub-frame x 1/125uS = 512Kbps
D-Ch : reserved
B-Ch : 64Kbps



TX_HIGHWAY



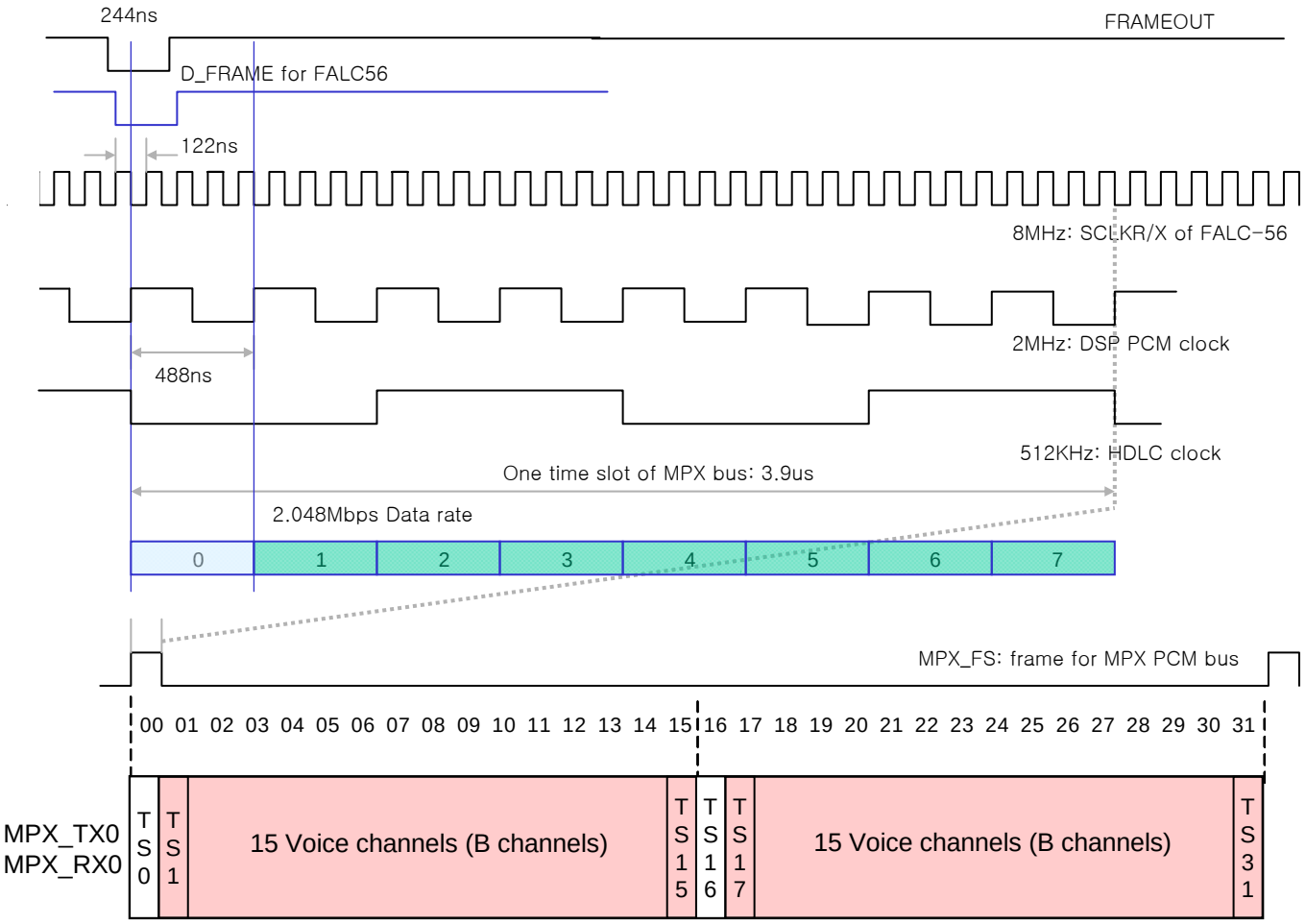
RX_HIGHWAY

HDLC/D + 6B

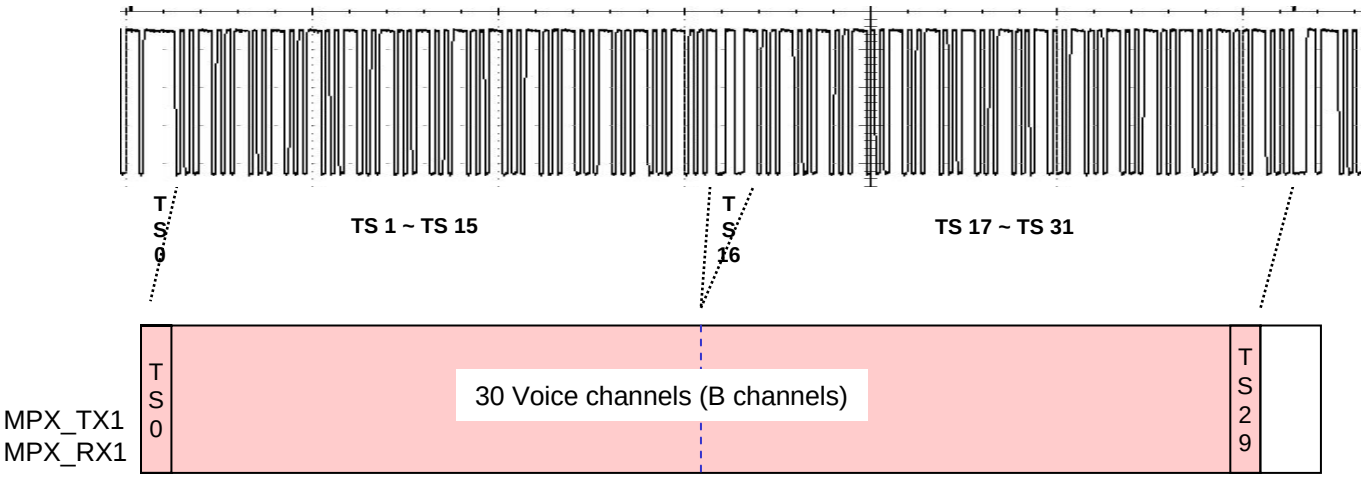
HDLC: Idle (tri-state)
D-Ch : Idle (tri-state)
B-Ch : Idle (55h or D5h)

9.1.8 Clock generation & PCM bus(ACT-2)

Sheet 4/11



Multiplexing PCM bus0: 32 time slots per frame:
TS0: FAS/NFAS, TS16: MFAS/ABCD CAS signaling
TS1~TS15/TS17~TS31: B channels



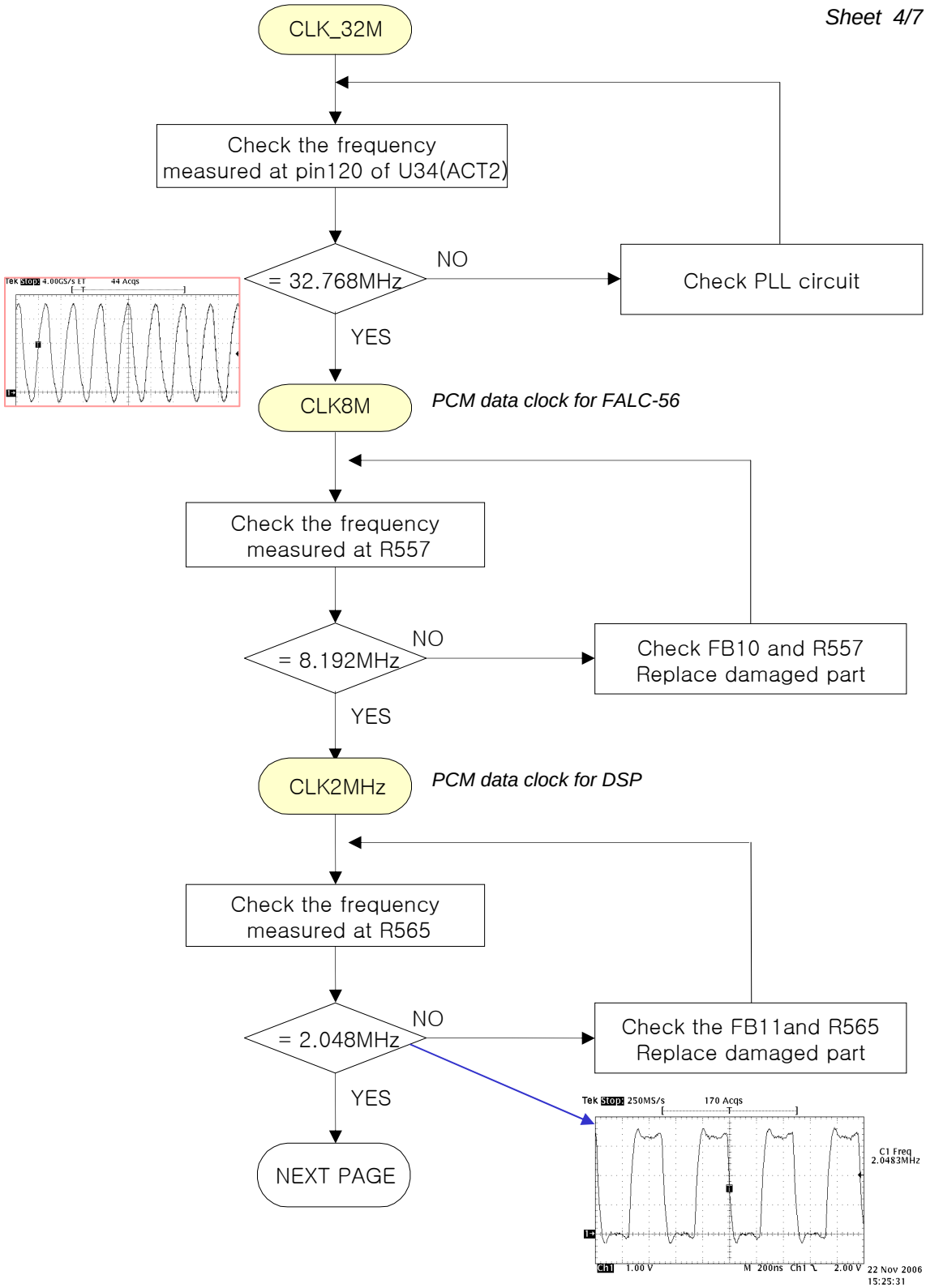
Multiplexing PCM bus1: 32 time slots per frame:
TS0~TS29: B channels for DSP that decodes/encodes MFC-R2 tones.

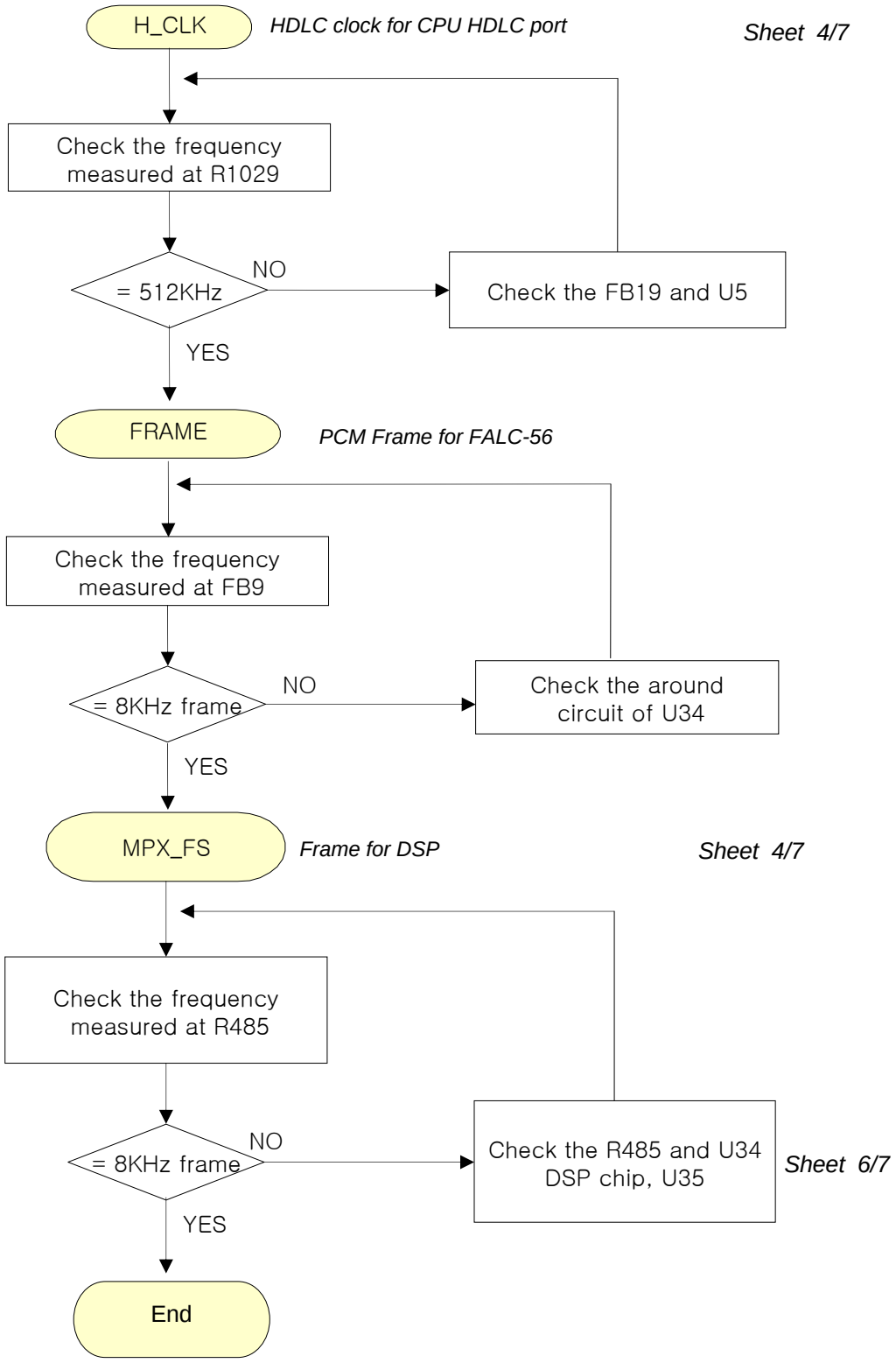
< Clock generation and MPX PCM highway >

Reference triggering signal is FRAME(FRAMEOUT) as for measuring CLKOUT and FRAMEOUT signals.

- CLKOUT: H_CLK(HDLC clock), CLK2M(2.048MHz PCM clock), CLK8M(8.192MHz PCM clock)
- FRAMEOUT: MPX_FS(125uS PCM frame)

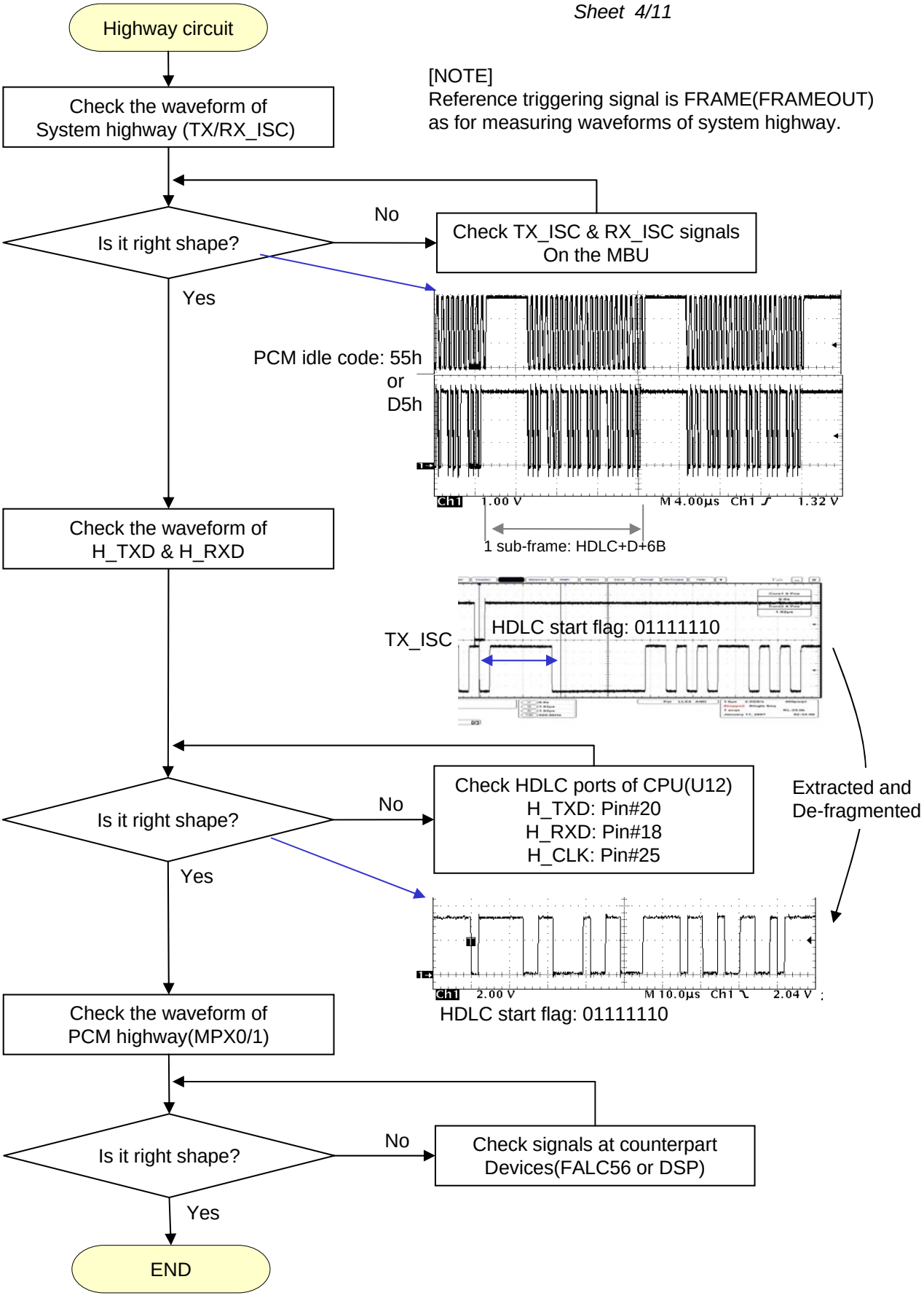
Sheet 4/7




H_CLK
HDLC clock for CPU HDLC port
Sheet 4/7
Check the frequency measured at R1029
= 512KHz
NO
Check the FB19 and U5
YES
FRAME
PCM Frame for FALC-56
Check the frequency measured at FB9
= 8KHz frame
NO
Check the around circuit of U34
YES
MPX_FS
Frame for DSP
Sheet 4/7
Check the frequency measured at R485
= 8KHz frame
NO
Check the R485 and U34 DSP chip, U35
Sheet 6/7
YES
End

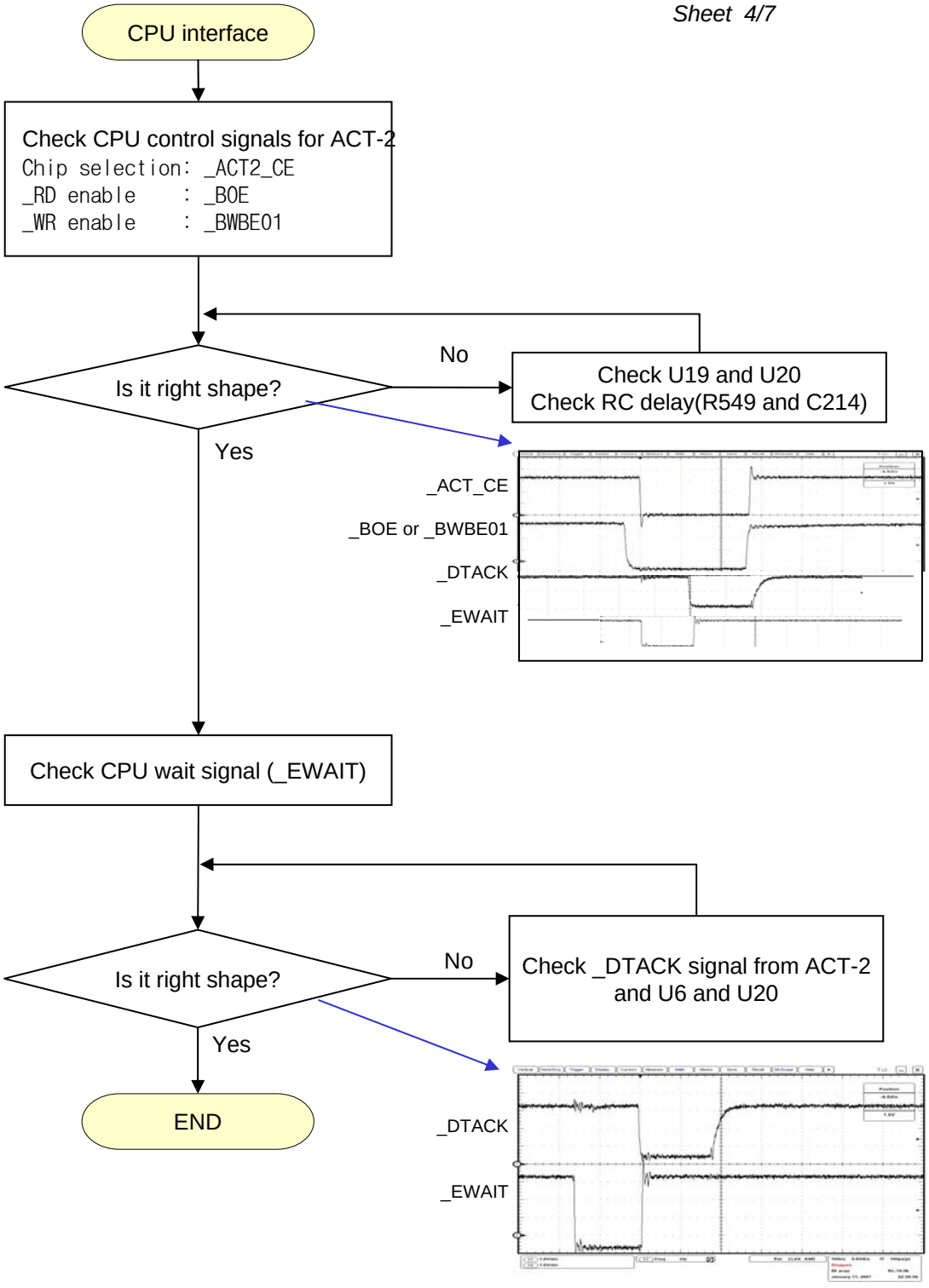
9.1.9 System Highway and MPX PCM Highway circuits

Sheet 4/11



9.1.10 ACT-2 CPU interface circuit

Sheet 4/7



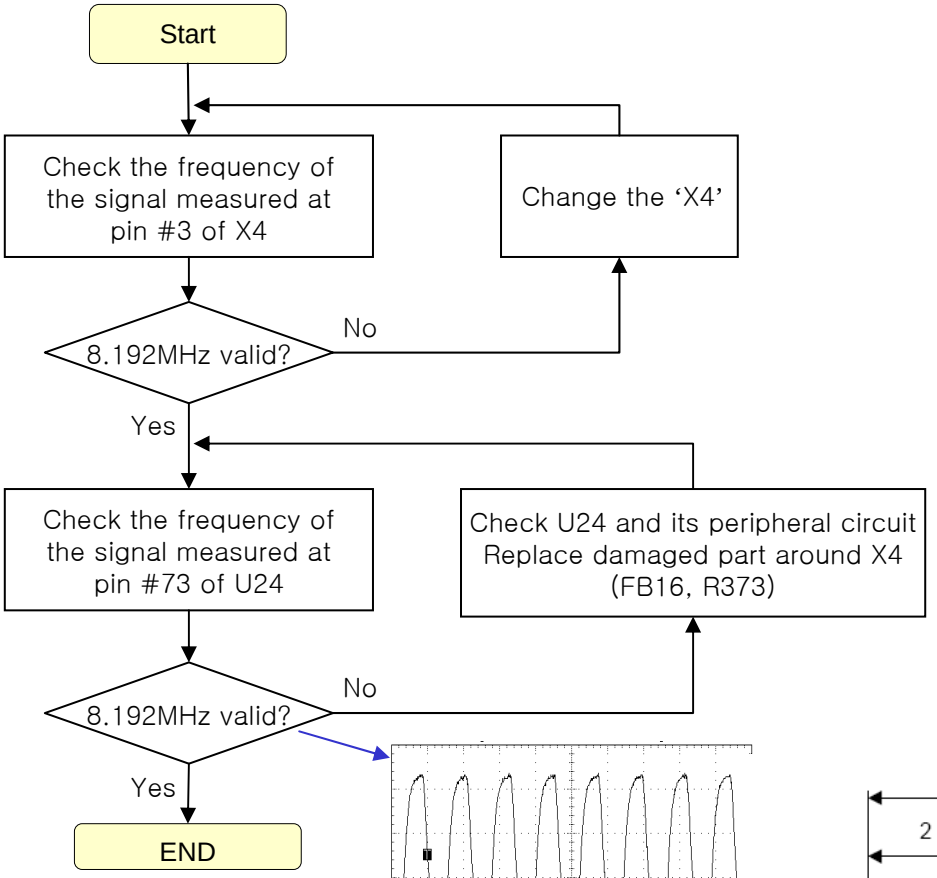
[NOTE] CPU interface

_EWAIT: External wait signal for CPU access cycle
_DTACK: Data ACK signal from ACT-2 to inform CPU that ACT-2 is ready for data transfer
_BWBE01: Write enable signal for 16bits data access

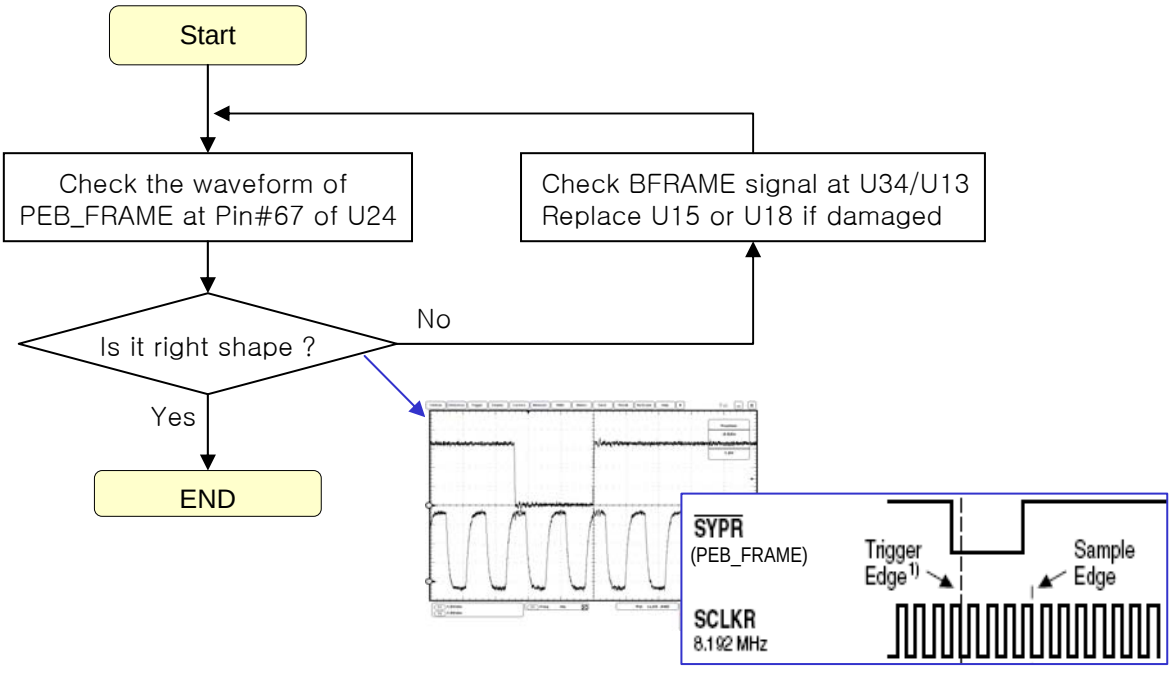
9.1.11 E1 interface circuit

1) Operation frequency check

Sheet 5/7

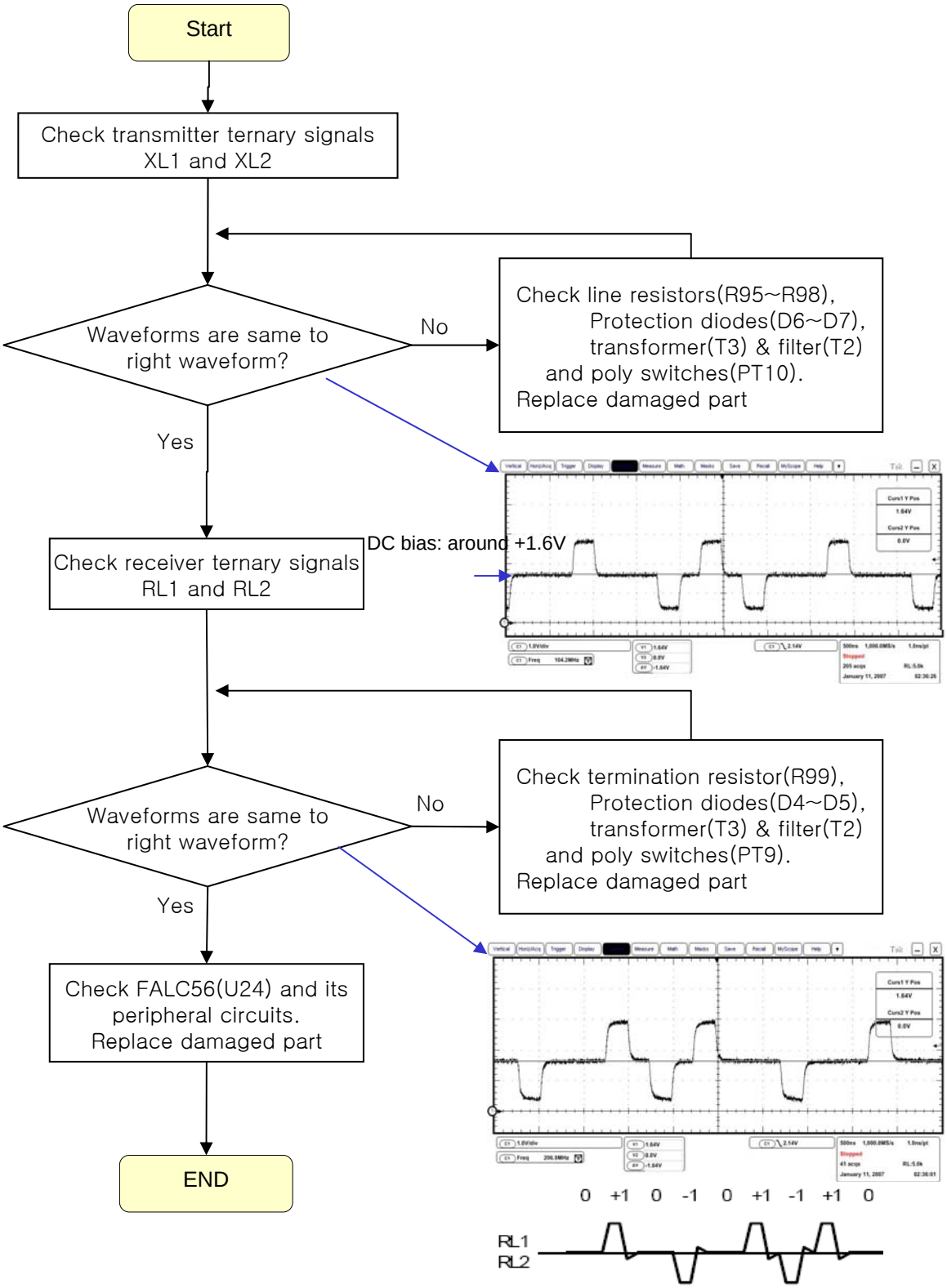


2) PEB_FRAME(_SYPR) timing check



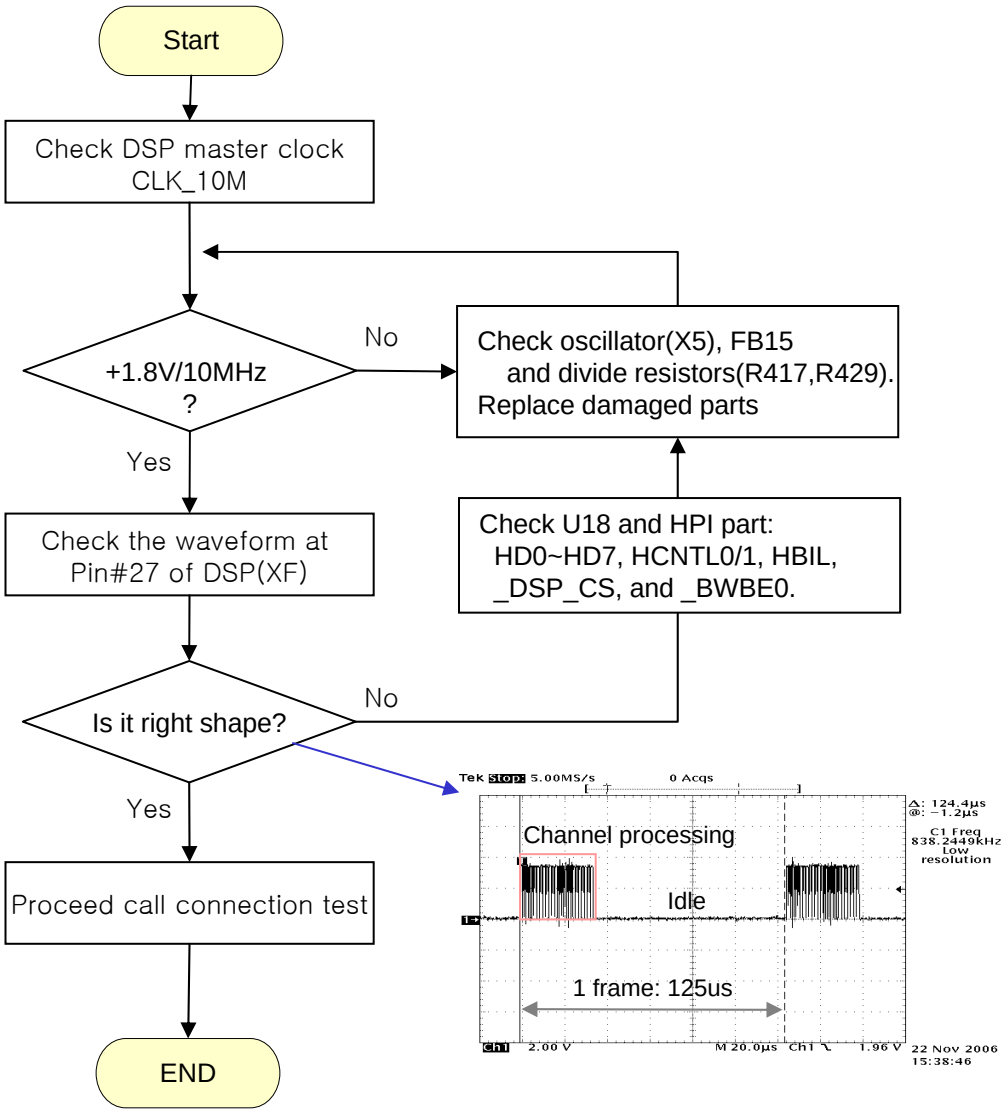
3) TX & RX Fail

Sheet 5/7



9.1.12 DSP(Digital Signal Processor) circuit

Sheet 6/7



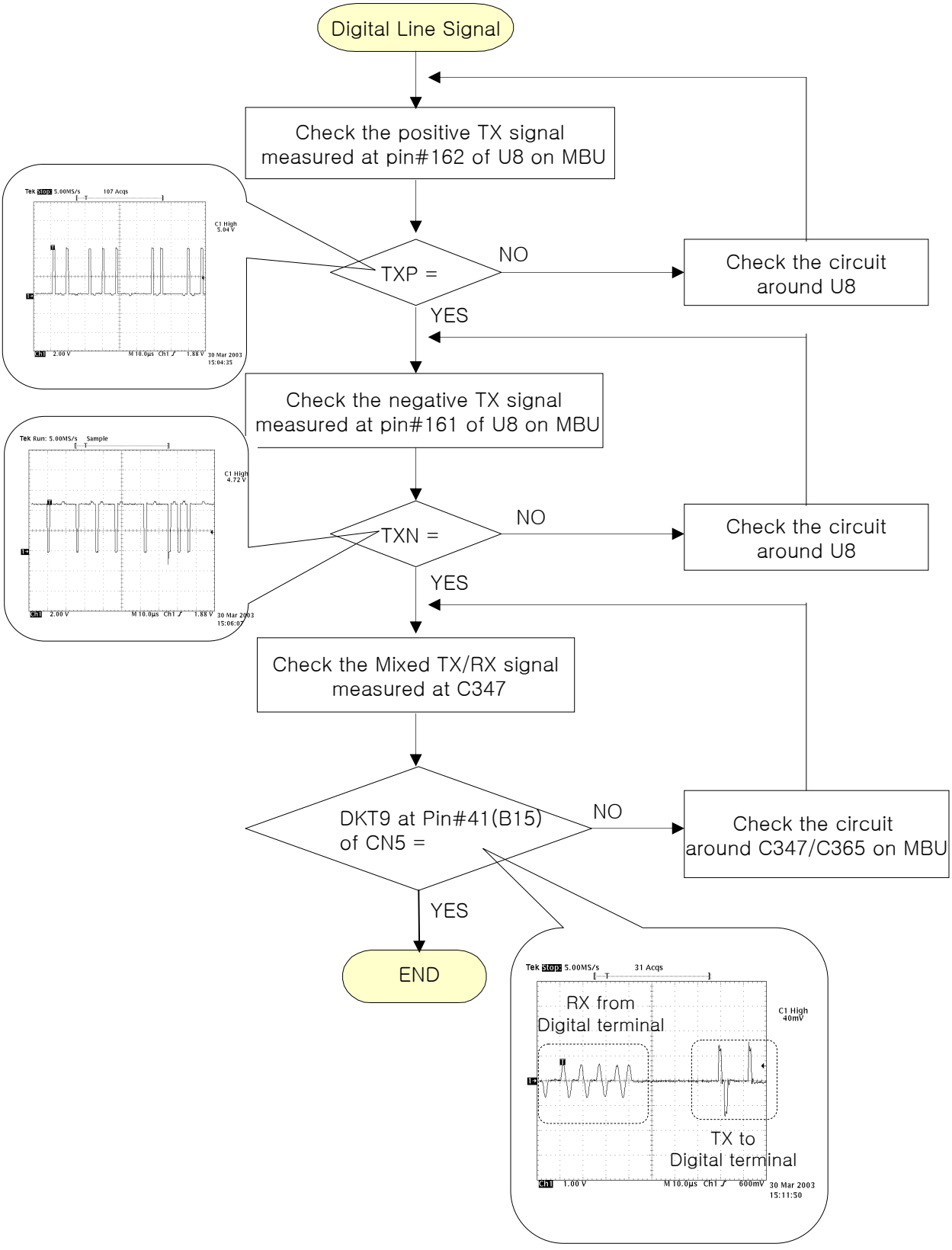
[NOTE] DSP(U35): TMS320VC5402
We can check whether or not DSP operates normally by measuring the waveform at Pin#27(XF) of DSP.
DSP toggles XF signal whenever it starts to process each channel among 30 channels.
MFC-R2 signals are switched from MPX bus0 to MPX bus1through ACT-2.

- MPX bus0: PCM bus for E1 transceiver(FALC56)
- MPX bus1: PCM bus for DSP(MFC R2 Encoder/decoder)

9.1.13 Digital Terminal Interface(1st port)

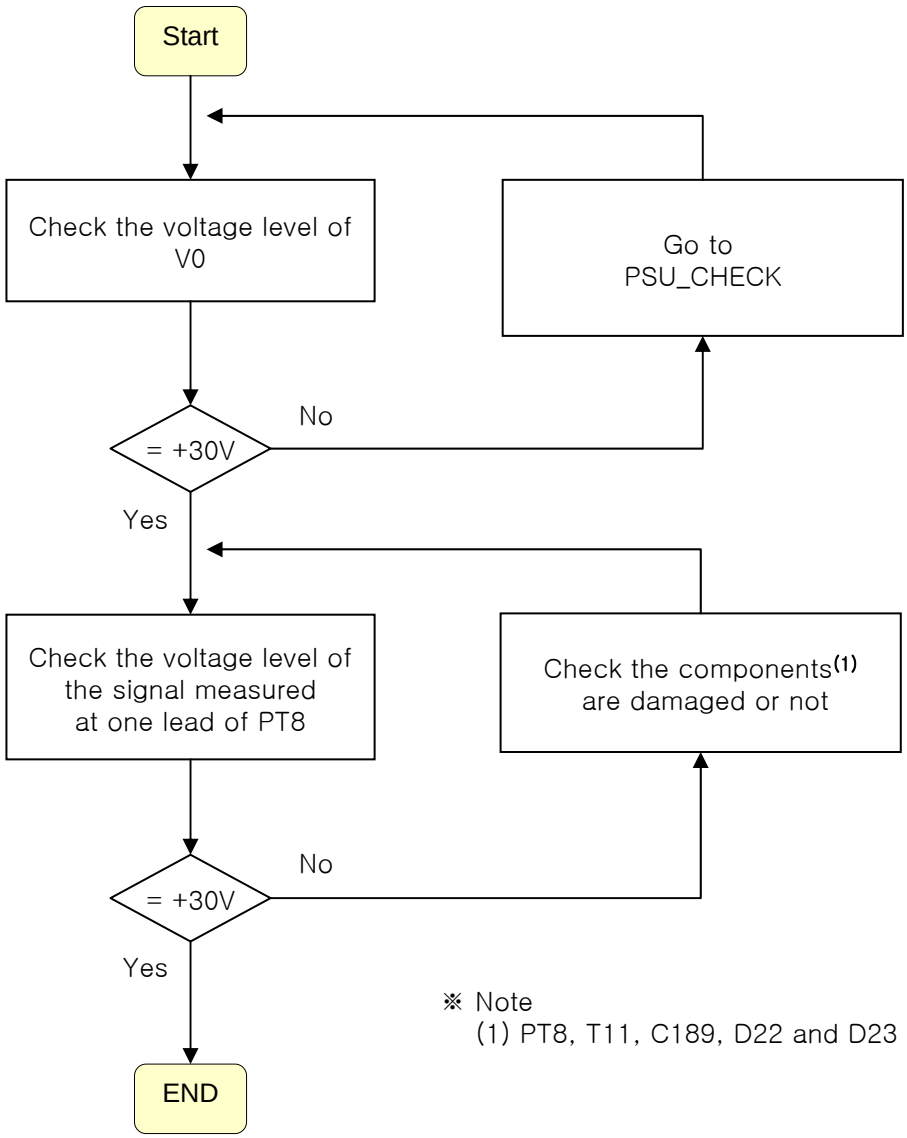
1) AMI signaling check

MBU Sheet 5/11



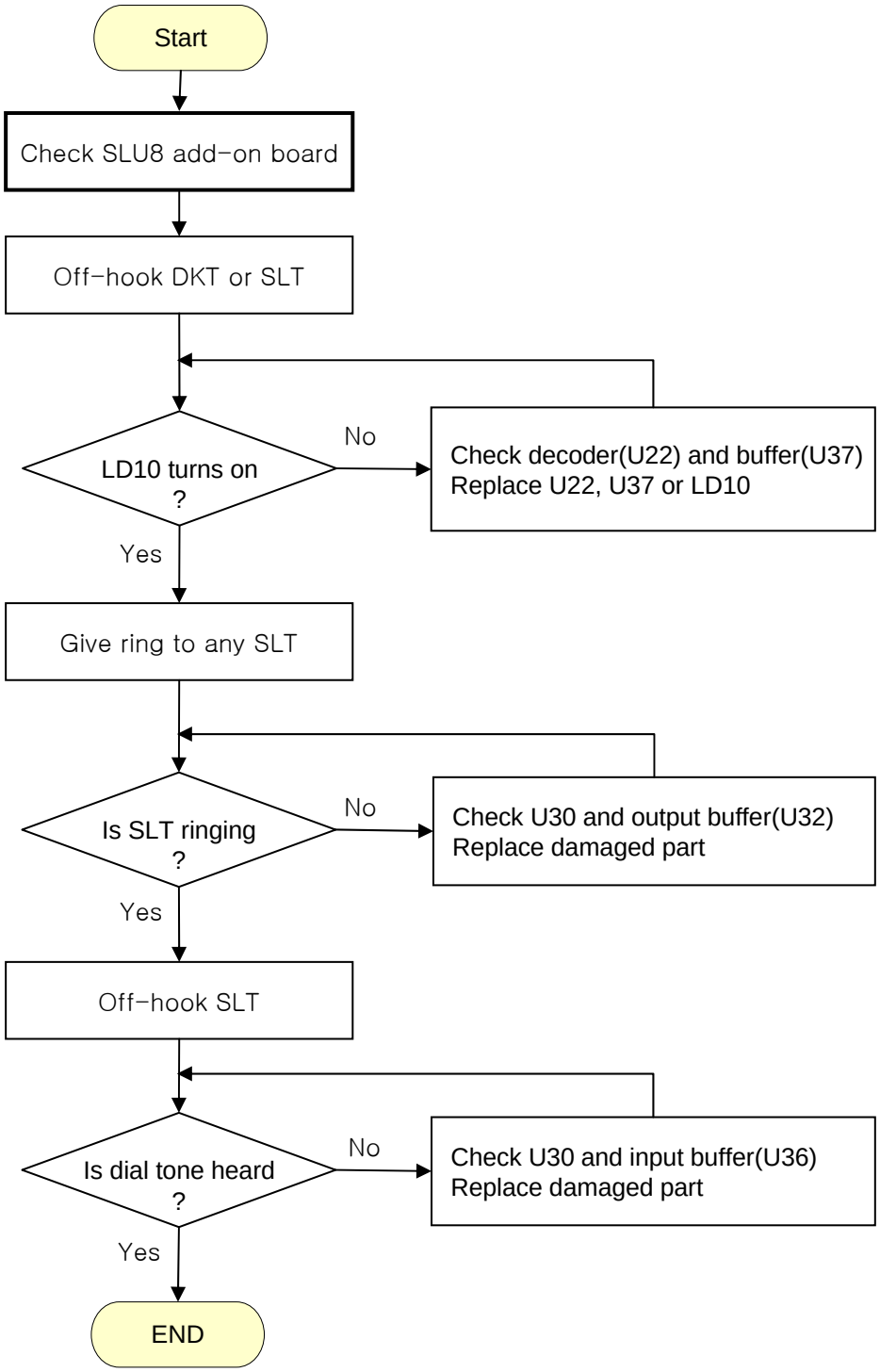
2) Line feeding voltage(+30V) check

Sheet 7/7



9.1.14 SLT interface circuit

For the SLT interface circuit on SLU8, add-on board, please refer to the descriptions of CSB316 extension board.

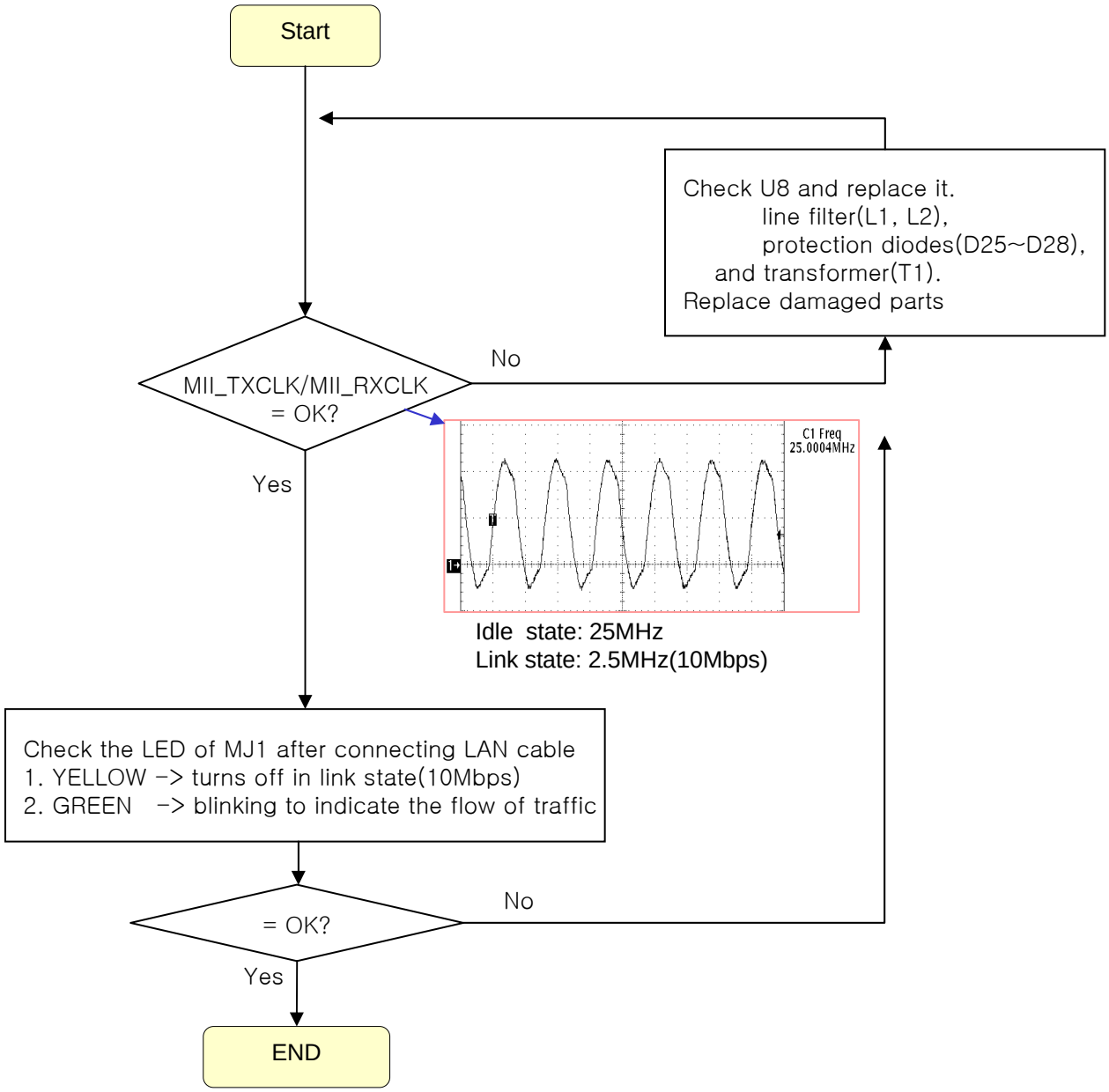


9.1.15 LAN interface circuit

1) +2.5V check

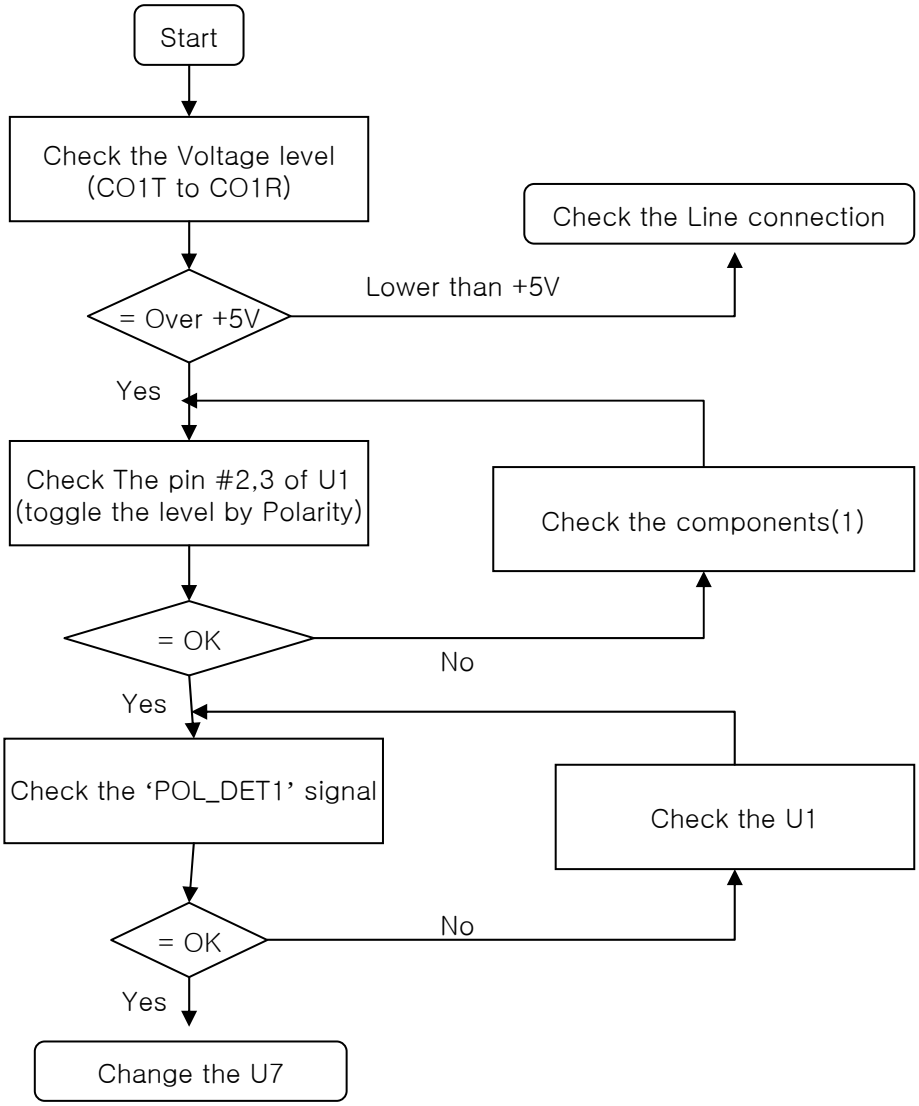
LAN PHY, U8, has internal switching regulator that generates +2.5Vdc voltage.
Check the voltage at Pin#38, VDDRCV, of U8.

2) Component check



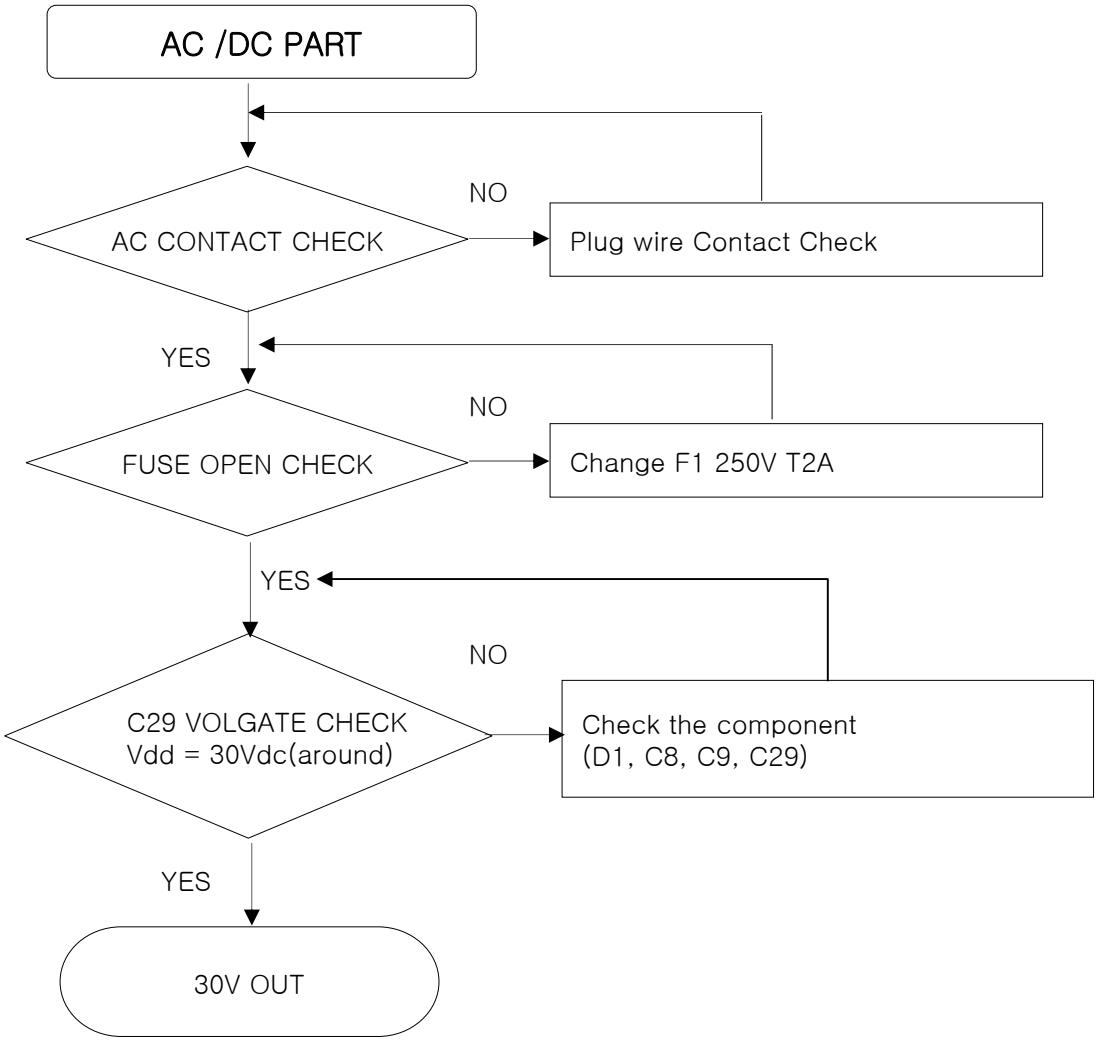
10. CMU12/50PR

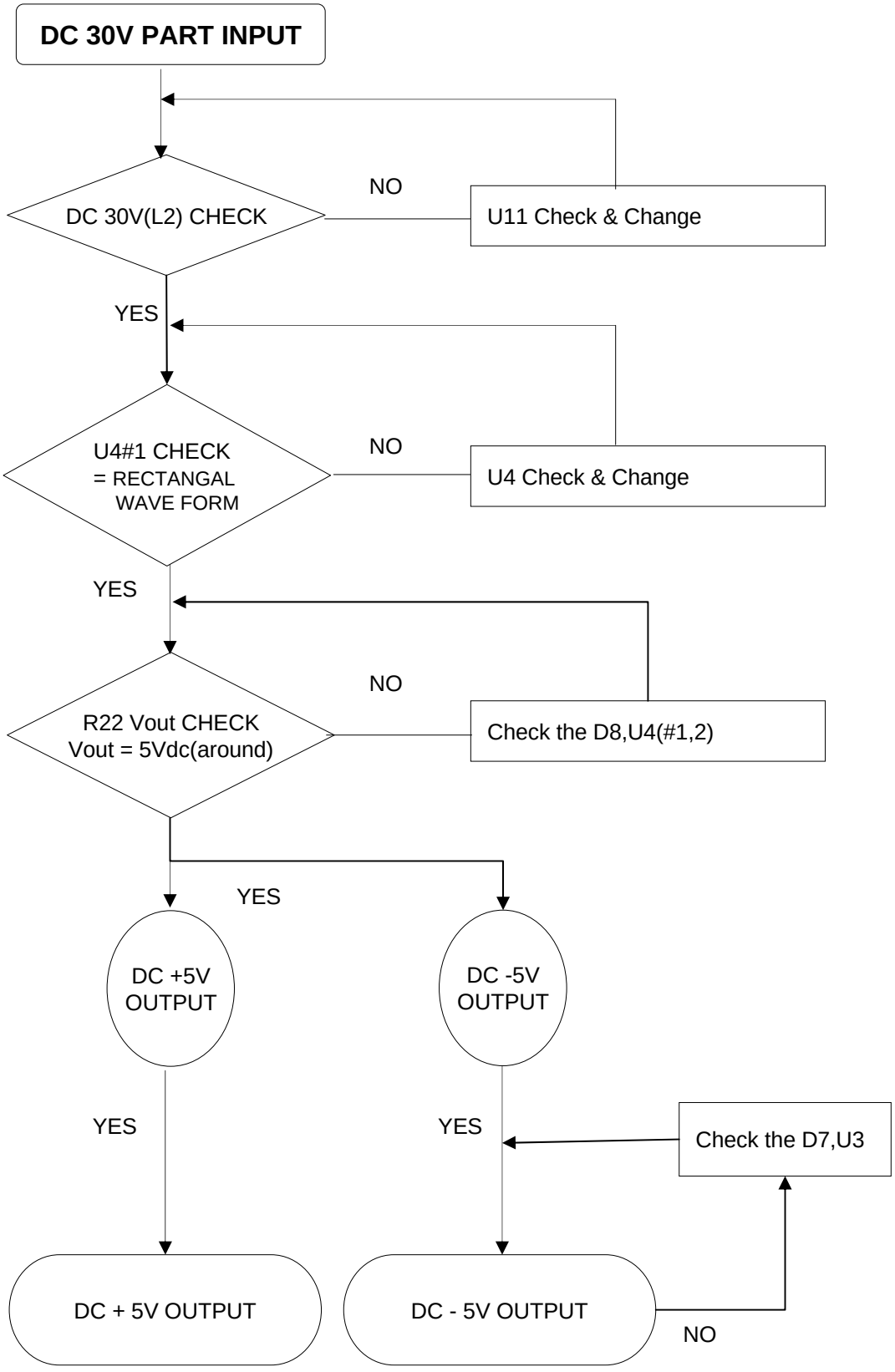
10.1 Polarity Reversal detection (1’st Port)



※ Note
(1) R1, R2, R11, R12, U1,R51,R41,R42, C1~2

11. PSU


AC /DC PART
AC CONTACT CHECK
NO
Plug wire Contact Check
YES
FUSE OPEN CHECK
NO
Change F1 250V T2A
YES
C29 VOLGATE CHECK
Vdd = 30Vdc(around)
NO
Check the component
(D1, C8, C9, C29)
YES
30V OUT


DC 30V PART INPUT
DC 30V(L2) CHECK
NO
U11 Check & Change
YES
U4#1 CHECK
= RECTANGAL
WAVE FORM
NO
U4 Check & Change
YES
R22 Vout CHECK
Vout = 5Vdc(around)
NO
Check the D8,U4(#1,2)
YES
DC +5V
OUTPUT
DC -5V
OUTPUT
YES
YES
Check the D7,U3
DC + 5V OUTPUT
DC - 5V OUTPUT
NO

SECTION 5. part list

5.1 BKSU

Level	Location No	Part No	Description	Specification
1		SRCY9011802	CDROM	SRCY03,S/W,KSU,600 MB
1		MLAC9006306	LABEL,BARCODE	IPLDK-60 BKSU BRA WA,
1		MLAZ9045001	LABEL	IPLDK-60 BKSU BRA WA,NORTEL MASTER BOX SPEC. LABEL
1		MCJY9002802	COVER,LOWER	IPLDK-60 BKSU STG WB,ipLDK-60 Housing Lower Dummy
1		SAFY9160202	PCB ASSY,MAIN	IPLDK-60 BKSU BRA,MAIN,1.8
.2	T11-17	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP
.2	T21-28	STMY0004001	TRANSFORMER,MATCHING	STMY0004001,6 PIN,DIP
.2	T30	STMY0000601	TRANSFORMER,MATCHING	STMY601,8 PIN,DIP,RING
.2	Q53,Q55	EQBN0004101	TR,BJT,NPN	ZTX658,TO-92,1W,TP
.2	C401-403,C820	ECFB0000302	CAP,FILM,MPE	1uF 250V
.2	C814	ECFB0000212	CAP,FILM,MPE	0.1uF 250V
.2	AR1-3	SEAY0000301	ARRESTOR	T83-A350X,350 V,RAD
.2	CN1	ENCY0001101	CONNECTOR,BOX HEADER	2020-50SR-01,50PIN,1.25mm,ANGLE
.2	CN2	ENHY0006301	CONNECTOR,HEADER	JE118-D17T-50,50 PIN,2.54 mm,STRAIGHT,PIN HEADER
.2	CN4	ENNY0001902	CONNECTOR,HOUSING TO BOARD	PCN10-20P-2.54DSA,20PIN,2.54mm,STRAIGHT
.2	CN5	ENNY0001903	CONNECTOR,HOUSING TO BOARD	PCN10-32P-2.54DSA,32PIN,2.54mm,STRAIGHT
.2	CN6	ENHY0001604	CONNECTOR,HEADER	JE118-A8G-14,14PIN,2.54mm,STRAIGHT
.2	CN7	ENGY0000204	CONNECTOR,D-SUB	LWP-1143-07,7PIN,3.96mm,STRAIGHT
.2	CN8	ENGY0000306	CONNECTOR,D-SUB	DC-0902MAP,9PIN,2.77mm,ANGLE
.2	CN10	ENHY0001606	CONNECTOR,HEADER	JE118-A8G-20,20PIN,2.54mm,STRAIGHT
.2	CN14	ENHY0005304	CONNECTOR,HEADER	JE118-D8T-16,16 PIN,2.54 mm,STRAIGHT
.2	CN16	ENHY0002601	CONNECTOR,HEADER	JE118-A8G-10,10PIN,2.54mm,STRAIGHT,GOLD
.2	SW1	ESDY0000103	SWITCH,DIP	KSD42H,24V,0.3A,4POLE,RAD
.2	SW2	ESDY0000101	SWITCH,DIP	BSM-101A,24V,0.3A,1POLE,RAD
.2	MJ1	ENJM0000101	CONN,JACK/PLUG,MODULAR	AR-623G3-S2-GY30,2 PIN,3 JACK,PCB MOUNT,UL/AU50
.2	MJ3	ENJM0008803	CONN,JACK/PLUG,MODULAR	0810-1X1T-36-F,10 PIN,ANGLE,10/100BASE-TX EXTENDED TEMP BELMAG WITH LEDS
.2		GTFB0002001	SCREW TAP TITE,PAN B	GTFB0002001,3MM,10MM,SB41(FZY),B,+,TB M3 X10 SZ P
.2		MCJZ0029301	COVER	IPLDK-20 MBU AUS BK,LDK-20 50pin Connector Cover
..3	U1	EUSY0224001	IC,1M*8BIT LOW POWER AND LOW VOLTAGE CMOS SRAM	BS62LV8001EIP70,TSOP2,44 PIN,R/TP
..3	U2	WSSY9005701	SOFTWARE,ASSEMBLY	U2(EUSY0050401),WSYY9332501
..3	U3	WSSY9005702	SOFTWARE,ASSEMBLY	U3(EUSY0050401),WSYY9332801
..3	U4	EUSY0099401	IC,MICROCONTROLLER	S3C4530A1-QE80,QFP,208 PIN,BK
..3	U7	EUSY0120401	IC,SYNCHRONOUS DRAM	MT48LC4M32B2P-7,TSOP,86 PIN,BK
..3	U8	EUCA9002801	IC,ASIC	ACT-2,0.2,MQFP,240 PIN,ETC
..3	U9-11	EUSY0016901	IC,SICOFI-4	PEB2466-H,QFP,64PIN.BK
..3	U12	EUSY0073901	IC,250KBPS RS-232 TRANSCEIVERS	ICL3238EIAZ-T,SSOP,28 PIN,R/TP,PB-FREE

Level	Location No	Part No	Description	Specification
..3	U20,U40	EUSY0050701	IC,LOW EMI SPECTRUM SPREAD CLOCK	CYIFS781BSXC,SOIC,8 PIN,R/TP
..3	U23	EUSY0049201	IC,UNDERVOLTAGE SENSING	MC34064D-5R2G,SO-8,8 PIN,R/TP
..3	U24	EUSY0003101	IC,REAL TIME CLOCK	Q42724211000200,DIP,18PIN.ST
..3	U25	EUSY0149001	IC,,SECURE MEMORY	AT88SC153-10SU-XX-2.7,SOIC,8 PIN,R/TP
..3	U30	EUSY0270801	IC,3.3V Single Power Phy	KSZ8721SL,SSOP,48 PIN,R/TP,Pb Free
..3	U38	EUSY0049101	IC,3A LDO REGULATOR	FAN1587AM33X,TO-263,3 PIN,R/TP,PB-FREE
..3	U44	EUSY0111801	IC,QUAD BUS BUFFER WITH 3-STATE CONTROL INPUTS	MC74VHC125DT,TSSOP,14 PIN,R/TP
..3	U45,U70,U72-73,U125	EUSY0085301	IC,LOW VOLTAGE CMOS OCTAL BUFFER	MC74LCX541DTR2G,TSSOP,20 PIN,R/TP,3-STATE
..3	U50	EUSY9290501	IC,8Poly Melody IC	HT36A3,SOP,20 PIN,R/TP
..3	U52-53	EUSY0036802	IC,TR ARRAY	KID65003AF,SOIC,16PIN.R/TP
..3	U60,U110,U112	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,R/TP,PB-FREE
..3	U63	EUSY0037002	IC,PWM CONTROLLER	TL494CDR2G,SOIC,16 PIN,R/TP,Pb-free
..3	U71,U82,U123-124,U126	EUSY0049801	IC,LOW VTG OCTAL BUS TRANSCEIVER	TC74LCX245FT,TSSOP,20 PIN,R/TP
..3	U85	EUSY0033802	IC,BINARY COUNTER	MM74HC4060MX_NL,SOIC,16 PIN,R/TP,PB-FREE
..3	U89	EUSY0049701	IC,OCTAL BUS BUFFER/NON INVERTING	TC74ACT541FT,TSSOP,20 PIN,R/TP
..3	U101,U103,U108,U111	EUSY0037302	IC,OP AMP	NJM4556M,SOIC,8PIN.R/TP
..3	U104,U109	EUSY0031102	IC	HEF-4066BT,SOIC,14PIN.R/TP,LOGIC
..3	U113,U116,U118	EUSY0037302	IC,OP AMP	NJM4556M,SOIC,8PIN.R/TP
..3	U114,U117	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,R/TP,PB-FREE
..3	U119	EUSY0130003	IC,DC-DC CONVERTER	NCP1117ST18T3G,SOT-223,3 PIN,R/TP,PB-FREE
..3	U120-121	EUSP0187701	IC,PBX	EPM3128ATC100-10,TQFP,100 PIN,PLD,192 MHZ,CLOCK 250MHZ
..3	U122	EUSY0078101	IC,DC-TO-DC CONVERTER CONTROL CIRCUITS	MC34063AD,SO-8,8 PIN,R/TP
..3	X1	EXXY0005801	X-TAL,25 MHz	25MHZ HC-49/SM,50 PPM,20 pF,50 ohm,SMD,11.4*4.67*3.4
..3	X3	EXSY0001201	OSCILLATOR,32.768 MHz	KMS-870R 32.768MHZ,25 PPM,15 pF,SMD,7.0*5.0*1.7
..3	X4	EXSY0001401	OSCILLATOR,10 MHz	KMS-873C 10MHZ,50 PPM,15 pF,SMD,7.0*5.0*1.7
..3	L2	STCY0001002	CHOKE COIL	STCY0001002,0.22 mH,RAD
..3	L3-4	STCY0001301	CHOKE COIL	STCY0001301,0.1 mH,RAD
..3	Q1	EQFN0002201	TR,FET,N-CHANNEL	NDS355AN,SOT-23,0.5 W,30 V,1.7 A,R/TP
..3	Q2,Q8-10,Q50-51	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	Q11,Q13,Q15	EQBN0004202	TR,BJT,NPN	FZT655,SOT223,2 W,R/TP
..3	Q12,Q14,Q16	EDSY0002801	DIODE,SWITCHING	KDS184-RTK,SOT-23,85V,0.3A,R/TP
..3	Q21-27	EQBP0001402	TR,BJT,PNP	MMBTA63,SOT-23,0.35W,R/TP
..3	Q31-37	EQBN0003001	TR,BJT,NPN	MMBTA13,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q52	EQBN0004201	TR,BJT,NPN	FZT653,SOT-223,2W,R/TP
..3	Q54,Q56	EQBP0000801	TR,BJT,PNP	ZTX758,TO-92,1W,TP
..3	Q57-71	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	Q72-78	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	L6	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M,R/TP,ROHS
..3	ZD4,ZD58	EDTY0000501	DIODE,TVS	P6SMBJ6.0A,DO-214AA,6V,600W,R/TP

Level	Location No	Part No	Description	Specification
..3	ZD11-16,ZD21-26,	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD41-47,ZD51-57	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD59-65	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D1,D3,D5,D7,D10	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	D2,D20	EDSY0002101	DIODE,SWITCHING	FM140,SMD,40V,1A,R/TP
..3	D4,D6	EDSY0002301	DIODE,SWITCHING	BAS70-04,SOT-23,70V,0A,R/TP
..3	D11-13	EDTY9009202	DIODE,TVS	P0300SBLRP,DO-214A,25 V,W,R/TP
..3	D14-15,D21-27	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D41-48,D51-58	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D136-138,D141	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB),400 V,1.5 A,R/TP,FAST SWITCHING
..3	D139	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	D142	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	LD1-4	EDLH9012301	DIODE,LED,CHIP	HT-170NB,Blue,ETC,R/TP
..3	BD1-3,BD11-17	EDBY0000601	DIODE,BRIDGE	EDBY0000601(THAILAND),SMD,600V,0.5A,R/TP
..3	RL4-6,RL11-17	EKMY0002801	RELAY,DC	G6K-2F-Y-TR DC4.5V,4.5 V,A,V,A,ohm,2
..3	RL7	EKAY0002601	RELAY,MINIATURE	FTR-C1GA005-G,5 V,1 A,V,A,179 ohm
..3	FB1-2	SFBH0000301	FILTER,BEAD,CHIP	HH-1M2012-121,120ohm,2012,R/TP
..3	FB3,FB8,FB12-21	SFBH0000401	FILTER,BEAD,CHIP	HH-1M2012-102JT,1000ohm,2012,R/TP
..3	FB4-6,FB32	ERHY0000433	RES,CHIP	300 1/16W
..3	FB7,FB9-11,FB52-56	SFBH0007401	FILTER,BEAD,CHIP	HB-1M1608- 121JT,120 ohm,1608
..3	FB30-31,FB60	SFBH0001204	FILTER,BEAD,CHIP	HB-1M1608-301JT,300 ohm,1608
..3	FB50-51	SFBH0000401	FILTER,BEAD,CHIP	HH-1M2012-102JT,1000ohm,2012,R/TP
..3	FB57	ERHY0000401	RES,CHIP	0 1/16W
..3	FB58-59	SFBH0001501	FILTER,BEAD,CHIP	HH-1M1608-121JT,120 ohm,1608
..3	PT21-28	SETY0000701	THERMISTOR	PSR21083B-2,PTC,RAD
..3	SW3	ESCY0000901	SWITCH,TACT	EVQQXP03W,15 V,20 mA,HORIZONTAL,G,LIGHT TOUCH
..3	C1-4	ECCH0000222	CAP,CERAMIC,CHIP	33pF 50V
..3	C5-6,C18,C24	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C7-9,C967	ECCH0000213	CAP,CERAMIC,CHIP	10pF 50V
..3	C10,C57,C100,C104	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C11,C16,C58-59,C139	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C12,C19-23,C25-41	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C13,C17,C56	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C14	ECCH0000332	CAP,CERAMIC,CHIP	220pF 50V
..3	C15,C411-413	ECCH0000356	CAP,CERAMIC,CHIP	10nF 50V
..3	C42	ECCH0000250	CAP,CERAMIC,CHIP	1.8nF 50V
..3	C43	ECCH0000246	CAP,CERAMIC,CHIP	820pF 50V
..3	C51,C441-443	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C53,C280,C289-299	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C101-103,C105	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C106,C318,C500	ECCH0000218	CAP,CERAMIC,CHIP	22pF 50V
..3	C141,C301,C303,C305	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C140,C300	ECTH0000124	CAP,TANTAL,CHIP	10uF 16V
..3	C142,C821,C1023	ECTH0000144	CAP,TANTAL,CHIP	100uF 10V

Level	Location No	Part No	Description	Specification
..3	C204-205	ECCH0000257	CAP,CERAMIC,CHIP	6.8nF 50V
..3	C206,C308,C319	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C207,C910-913	ECCH0000217	CAP,CERAMIC,CHIP	20pF 50V
..3	C302,C304,C326,C333	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C306,C320-325	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C307	ECCH0000236	CAP,CERAMIC,CHIP	220pF 50V
..3	C312-313,C581-587	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C315,C317,C654-655	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C327-332,C336,C338	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C335,C337,C472,C474	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C339-354,C521-527	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C357-372,C487	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C375-376,C462-463	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C421-423	ECTH0000136	CAP,TANTAL,CHIP	33uF 10V
..3	C431-433	ECES0000102	CAP,AL ELEC,SMD	2.2uF 50V
..3	C451-453,C485,C488	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C461,C464,C467	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C468,C489,C491-492	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C469,C571,C573,C575	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C471,C473,C475	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C476,C642-647,C661	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C481-484,C493-496	ECCH0001813	CAP,CERAMIC,CHIP	1000pF 50V
..3	C486	ECCH0000348	CAP,CERAMIC,CHIP	2.2nF 50V
..3	C490,C497,C591-597	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C501-507,C511-517	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C541-547	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C551-557	ECCH0000358	CAP,CERAMIC,CHIP	15nF 50V
..3	C561-567,C691	ECES0000120	CAP,AL ELEC,SMD	4.7uF 50V
..3	C577,C611,C613,C615	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C600,C1035	ECCH0000218	CAP,CERAMIC,CHIP	22pF 50V
..3	C601-607,C1034	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C617,C631,C633,C635	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C621-627,C712,C714	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C641,C995	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C657,C667,C684	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C637,C685-686,C690	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C650,C761-768	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C653,C658-660,C663	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C656,C666,C683	ECCH0000247	CAP,CERAMIC,CHIP	1nF 50V
..3	C662,C672,C689	ECCH0000274	CAP,CERAMIC,CHIP	0.22uF 16V
..3	C664-665,C681-682	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C668-670,C673,C680	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C671,C688,C988	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C687,C722,C731,C779	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V

Level	Location No	Part No	Description	Specification
..3	C692,C801,C804,C806	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C701-706	ECCH0008201	CAP,CERAMIC,CHIP	47000pF 200V
..3	C716,C992-994	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C721,C723,C725	ECCH0000220	CAP,CERAMIC,CHIP	27pF 50V
..3	C741-748,C751-758	ECCH0000345	CAP,CERAMIC,CHIP	1.5nF 50V
..3	C771-778	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C780,C812	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C800,C1026-1033	ECCH0000247	CAP,CERAMIC,CHIP	1nF 50V
..3	C802-803,C805	ECTH0000112	CAP,TANTAL,CHIP	1uF 35V
..3	C809,C1013-1019	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C810,C1058	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C811	ECCH0000347	CAP,CERAMIC,CHIP	2nF 50V
..3	C813,C817	ECCM0000227	CAP,CERAMIC,MLC	100pF 500V
..3	C815,C902-904,C1012	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C816	ECET0000514	CAP,AL ELEC	10uF 100V
..3	C900-901,C987	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C906	ECTH0000109	CAP,TANTAL,CHIP	1uF 16V
..3	C914,C930,C949,C966	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C915-929,C931-948	ECCH0000217	CAP,CERAMIC,CHIP	20pF 50V
..3	C950-951	ECCH0000255	CAP,CERAMIC,CHIP	4.7nF 50V
..3	C952-961,C991	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C962-965,C1050-1051	ECCH0000217	CAP,CERAMIC,CHIP	20pF 50V
..3	C989-990,C1047	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C996-1011	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C1020-1021	ECET0001503	CAP,AL ELEC	220uF 50V
..3	C1022	ECCH0000339	CAP,CERAMIC,CHIP	470pF 50V
..3	C1024-1025,C1042	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C1036-1041	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C1043	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C1046,C1056-1057	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C1049	ECCH0000240	CAP,CERAMIC,CHIP	330pF 50V
..3	C1052-1055,C1059	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R1-22,R109-114	ERHY0000466	RES,CHIP	10K 1/16W
..3	R23-44,R181-183	ERHY0000410	RES,CHIP	22 1/16W
..3	R45-76,R127-132	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	R77-108,R776,R779	ERHY0000450	RES,CHIP	2.2K 1/16W
..3	R116-126,R169-170	ERHY0000466	RES,CHIP	10K 1/16W
..3	R134-139,R171	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	R141-145,R389	ERHY0000420	RES,CHIP	68 1/10W
..3	R146,R172,R201	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R147-148,R150-156	ERHY0000433	RES,CHIP	300 1/16W
..3	R158,R728-759	ERHY0000433	RES,CHIP	300 1/16W
..3	R165-166,R218,R770	ERHY0000918	RES,CHIP	33 1/10W
..3	R167,R1530,R1533	ERHY0000963	RES,CHIP	3.3K 1/10W

Level	Location No	Part No	Description	Specification
..3	R168,R196,R215,R283	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R177-180	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	R186-187,R210-214	ERHY0000410	RES,CHIP	22 1/16W
..3	R188-195,R197-200	ERHY0000466	RES,CHIP	10K 1/16W
..3	R204-209,R231	ERHY0000466	RES,CHIP	10K 1/16W
..3	R216-217,R233,R964	ERHY0000487	RES,CHIP	100K 1/16W
..3	R232,R500,R600,R700	ERHY0000445	RES,CHIP	1K 1/16W
..3	R234,R822,R824,R826	ERHY0000483	RES,CHIP	68K 1/16W
..3	R235	ERHY0000505	RES,CHIP	1M 1/16W
..3	R236,R355	ERHY0000943	RES,CHIP	470 1/10W
..3	R237,R240,R772	ERHY0000425	RES,CHIP	100 1/16W
..3	R238	ERHY0000490	RES,CHIP	180K 1/16W
..3	R239,R451,R453,R455	ERHY0000958	RES,CHIP	2K 1/10W
..3	R241,R591-597	ERHY0000968	RES,CHIP	5.1K 1/10W
..3	R245,R872	ERHY0000990	RES,CHIP	47K 1/10W
..3	R246	ERHY0000981	RES,CHIP	20K 1/10W
..3	R253-254,R322-325	ERHY0000412	RES,CHIP	33 1/16W
..3	R258-261,R356-358	ERHY0000967	RES,CHIP	4.7K 1/10W
..3	R262,R421-426	ERHY0000925	RES,CHIP	68 1/10W
..3	R263-265	ERHY0000434	RES,CHIP	330 1/16W
..3	R266-268,R1580	ERHY0000410	RES,CHIP	22 1/16W
..3	R277,R394,R396	ERHY0000401	RES,CHIP	0 1/16W
..3	R282,R956,R958	ERHY0000405	RES,CHIP	10 1/16W
..3	R284-287,R302-305	ERHY0000466	RES,CHIP	10K 1/16W
..3	R288-293	ERHY0000491	RES,CHIP	200K 1/16W
..3	R294-297,R299-301	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R327,R442,R444,R446	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R360-388,R390-391	ERHY0000412	RES,CHIP	33 1/16W
..3	R392,R400,R710	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R398-399,R713-714	ERHY0000401	RES,CHIP	0 1/16W
..3	R411,R413,R415	ERHY0001813	RES,CHIP	15K 1W
..3	R431,R433,R435	ERHY0000952	RES,CHIP	1K 1/10W
..3	R441,R443,R445	ERHY0000976	RES,CHIP	12K 1/10W
..3	R452,R454,R456	ERHY0000985	RES,CHIP	30K 1/10W
..3	R461,R463,R465	ERHY0001413	RES,CHIP	200 1/4W
..3	R462,R464,R466	ERHY0000933	RES,CHIP	150 1/10W
..3	R471,R473,R475	ERHY0000975	RES,CHIP	10K 1/10W
..3	R472,R474,R476	ERHY0000481	RES,CHIP	56K 1/16W
..3	R481,R483,R485	ERHY0000468	RES,CHIP	15K 1/16W
..3	R482,R484,R486	ERHY0000474	RES,CHIP	30K 1/16W
..3	R490,R778	ERHY0000959	RES,CHIP	2.2K 1/10W
..3	R491,R661-667	ERHY0000626	RES,CHIP	620 1/10W
..3	R492,R952	ERHY0000367	RES,CHIP	100K 1/16W
..3	R493	ERHY0000360	RES,CHIP	62K 1/16W

Level	Location No	Part No	Description	Specification
..3	R494,R496,R641-647	ERHY0000466	RES,CHIP	10K 1/16W
..3	R495,R771	ERHY0000910	RES,CHIP	10 1/10W
..3	R501-507,R511-517	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R521-527	ERHY0001902	RES,CHIP	1K 1/2W
..3	R531-537,R991	ERHY0001707	RES,CHIP	510 1/2W
..3	R541-547,R631-637	ERHY0014601	RES,CHIP	300 1/2W
..3	R551-557,R611-617	ERHY0000672	RES,CHIP	30K 1/10W
..3	R561-567,R601-607	ERHY0000663	RES,CHIP	15K 1/10W
..3	R571-577	ERHY0000952	RES,CHIP	1K 1/10W
..3	R581-587	ERHY0000697	RES,CHIP	300K 1/10W
..3	R651-657,R859,R871	ERHY0000975	RES,CHIP	10K 1/10W
..3	R671-677	ERHY0000479	RES,CHIP	47K 1/16W
..3	R681-687,R983	ERHY0000901	RES,CHIP	0 1/10W
..3	R691-697,R784,R786	ERHY0000466	RES,CHIP	10K 1/16W
..3	R701-707	ERHY0000474	RES,CHIP	30K 1/16W
..3	R711-712	ERHY0000412	RES,CHIP	33 1/16W
..3	R715-718,R802,R804	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R724-727,R791,R795	ERHY0000420	RES,CHIP	68 1/10W
..3	R764,R1002	ERHY0000632	RES,CHIP	1.2K 1/10W
..3	R765	ERHY0010001	RES,CHIP	270 1/10W
..3	R766	ERHY0000666	RES,CHIP	20K 1/10W
..3	R767	ERHY0000663	RES,CHIP	15K 1/10W
..3	R768-769	ERHY0000665	RES,CHIP	18K 1/10W
..3	R773	ERHY0000454	RES,CHIP	3.3K 1/16W
..3	R774,R785,R787	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R790,R794,R811,R813	ERHY0000466	RES,CHIP	10K 1/16W
..3	R800,R965-966,R1009	ERHY0000445	RES,CHIP	1K 1/16W
..3	R801,R803,R805	ERHY0001429	RES,CHIP	15K 1/4W
..3	R806,R851-856	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R815,R981,R1006-1008	ERHY0000466	RES,CHIP	10K 1/16W
..3	R831,R833,R835	ERHY0000496	RES,CHIP	330K 1/16W
..3	R841-848,R962	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R849-850	ERHY0000340	RES,CHIP	10K 1/16W
..3	R857	ERHY0000982	RES,CHIP	22K 1/10W
..3	R858	ERHY0000962	RES,CHIP	3K 1/10W
..3	R860,R867	ERHY0000973	RES,CHIP	8.2K 1/10W
..3	R868,R1531-1532	ERHY0000967	RES,CHIP	4.7K 1/10W
..3	R869	ERHY0000974	RES,CHIP	9.1K 1/10W
..3	R870	ERHY0001023	RES,CHIP	1.0M 1/10W
..3	R873,R875-877,R886	ERHY0000975	RES,CHIP	10K 1/10W
..3	R874,R882,R884,R890	ERHY0000991	RES,CHIP	51K 1/10W
..3	R878,R883	ERHY0000999	RES,CHIP	100K 1/10W
..3	R879-880,R885,R891	ERHY0001608	RES,CHIP	200 1/2W

Level	Location No	Part No	Description	Specification
..3	R881	ERHY0001605	RES,CHIP	100 1/2W
..3	R887	ERHY0000945	RES,CHIP	560 1/10W
..3	R888-889,R940-941	ERHY0000975	RES,CHIP	10K 1/10W
..3	R892	ERHY0001415	RES,CHIP	560 1/4W
..3	R900-920,R922-937	ERHY0000420	RES,CHIP	68 1/10W
..3	R938-939	ERHY0000925	RES,CHIP	68 1/10W
..3	R943-944	ERHY0001402	RES,CHIP	0 1/4W
..3	R954	ERHY0000342	RES,CHIP	12K 1/16W
..3	R955,R957,R959	ERHY0000428	RES,CHIP	180 1/16W
..3	R960,R1698	ERHY0000405	RES,CHIP	10 1/16W
..3	R967	ERHY0000472	RES,CHIP	24K 1/16W
..3	R968-973,R975-976	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R978-979,R1535-1536	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R984-990	ERHY0000917	RES,CHIP	30 1/10W
..3	R992-998	ERHY0000988	RES,CHIP	39K 1/10W
..3	R999-1001	ERHY0000903	RES,CHIP	1 1/10W
..3	R1003	ERHY0000673	RES,CHIP	33K 1/10W
..3	R1004	ERHY0000621	RES,CHIP	330 1/10W
..3	R1005	ERHY0000437	RES,CHIP	470 1/16W
..3	R1010-1011,R1014-1015	ERHY0000466	RES,CHIP	10K 1/16W
..3	R1012,R1504-1505	ERHY0000445	RES,CHIP	1K 1/16W
..3	R1013,R1016,R1537	ERHY0000412	RES,CHIP	33 1/16W
..3	R1500-1501,R1685	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R1502-1503	ERHY0000430	RES,CHIP	220 1/16W
..3	R1506-1507,R1510-1511	ERHY0004101	RES,CHIP	49.9 1/10W
..3	R1508-1509	ERHY0000343	RES,CHIP	13K 1/16W
..3	R1520,R1546,R1562	ERHY0000466	RES,CHIP	10K 1/16W
..3	R1534,R1552	ERHY0000420	RES,CHIP	68 1/10W
..3	R1548,R1579,R1591	ERHY0000401	RES,CHIP	0 1/16W
..3	R1553-1554,R1665-1666	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R1555-1561	ERHY0000985	RES,CHIP	30K 1/10W
..3	R1563	ERHY0000460	RES,CHIP	5.6K 1/16W
..3	R1565-1570	ERHY0000429	RES,CHIP	200 1/16W
..3	R1581	ERHY0000419	RES,CHIP	62 1/16W
..3	R1582,R1645	ERHY0000466	RES,CHIP	10K 1/16W
..3	R1592-1593,R1647-1648	ERHY0000410	RES,CHIP	22 1/16W
..3	R1643-1644	ERHY0000433	RES,CHIP	300 1/16W
..3	R1646,R1668	ERHY0009568	RES,CHIP	33 1/10W
..3	R1649-1664	ERHY0000420	RES,CHIP	68 1/10W
..3	R1667,R1683	ERHY0000466	RES,CHIP	10K 1/16W

Level	Location No	Part No	Description	Specification
..3	R1669-1681,R1699	ERHY0000420	RES,CHIP	68 1/10W
..3	R1682,R1684,R1686	ERHY0000401	RES,CHIP	0 1/16W
..3	R1687,R1689,R1691	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R1688,R1690,R1692	ERHY0000401	RES,CHIP	0 1/16W
..3	R1693,R1695,R1697	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R1694,R1696	ERHY0000401	RES,CHIP	0 1/16W
.2	U100,U102	SHPY0000101	PHOTOCOUPLER	TLP521-2GR,8PIN,2PORT,GR,DIP
.2	T1-3	STMY0000301	TRANSFORMER,MATCHING	6170NA0001D,5 PIN,DIP,4H:1H,T 2:1
.2	T4-5	STMY0021101	TRANSFORMER,MATCHING	21101,5 PIN,ETC,DCR(1-2:32,3-5:41)
.2	PT1-7,PT11-17	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD,6322NB00102
.2	PT35	SETY0000801	THERMISTOR	RXE-F050-2,PTC,RAD
.2	PT36-41	SETY0000601	THERMISTOR	TRF600-160-0.130,PTC,RAD
.2	ZD3	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD,43 V,1500 W,R/TP,TVS,DIODE
.2	RL8-9	EKMY0000101	RELAY,DC	G5N-1A DC24V,6920NB00101
.2	SW4	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	MJ2	ENJM9012301	CONN,JACK/PLUG,MODULAR	AR-623G8-S4-BK30,4 PIN,8 JACK,RJ11
.2	BAT1	SBCL0000101	BATTERY,CELL,LITHIUM	SB-AA02 2PIN,3.6V,1.2AH,1/2AA
.2	CN9	ENHY0001507	CONNECTOR,HEADER	JE117-A25G-06,6 PIN,2.54 mm,STRAIGHT
.2	CN13	ENNY0001604	CONNECTOR,HOUSING TO BOARD	5EHDRC-4P,4PIN,mm,ANGLE
.2	PJ1	ENJH0000201	CONN,JACK/PLUG,PHONE	DL-20121-PJ(RED),PCB MOUNT,RED
.2	PJ2	ENJH0000301	CONN,JACK/PLUG,PHONE	DL-20121-PJ(BLUE),PCB MOUNT,BLUE
1		SSPD9003003	POWER SUPPLY,AC-DC	NT80-M
1	U120	WSBB9200001	SOFTWARE,FIRMWARE,SYSTEM	123C,V1.1,ALTERA,U120,Checksum : 2887
1	U121	WSBB9200201	SOFTWARE,FIRMWARE,SYSTEM	8931,V1.1,ALTERA,U121 U121,Checksum : 8931
1		ABAZ0007420	BAG ASSY	IPLDK-60 BKSU STG ZZ,ipLDK-60 BKSU Bag Ass'y
.2		ABAZ0005002	BAG ASSY	IPLDK-60 EKSU STG BK,ipLDK-60 Rubber Foot Bag Ass'y
.2		ABAZ0006906	BAG ASSY	AR-BKSU MEX ZZ
.2		ABEA0000101	BOX ASSY,BASIC	ZZ,C39365-A9925-B503
.2		BTBA0000101	TIE,CABLE	BTBA0000101,SH-190
.2		ENNY0001602	CONNECTOR,HOUSING TO BOARD	5ESDV-0275,4PIN,mm,ANGLE
.2		MBAD0002406	BAG,VINYL(PE)	ZZ,K/P STATION H/S X DX A
.2		SWPY0005401	POWER CORD ASSY	M2511A,V1625A,CORE,H05VV-F 3*,1850 mm,BK,EUROPEAN APPROVED,VDE
.2		SWWA0000101	WIRE ASSY	SWWA0000101,3600 mm,4 LINE,16,UL1015
1		ABEZ9070201	BOX ASSY	IPLDK-60 BKSU TUR ZZ
.2		MBEE9064001	BOX,MASTER	IPLDK-60 BKSU STG ZZ
.2		MBEF9110301	BOX,UNIT	IPLDK-60 BKSU TUR ZZ
.2		MPAD9007301	PACKING,SHELL	LDK-1248 BKSU RUS ZZ
.2		MBAD0002404	BAG,VINYL(PE)	ZZ,K/P X DX A
1		MLDY9007201	LIGHT PIPE	AR-BKSU STG WB,ARIA SOHO Light Pipe
1		AHDA9028301	HOUSING ASSY,LOWER	IPLDK-60 BKSU STG WA,ipLDK-60 Housing Lower Ass'y
1		GMFY0001801	SCREW MACHINE,PAN	GMFY0001801,3 MM,6 MM,SB41(FZY),B,+,KB1023 M3 X 6

Level	Location No	Part No	Description	Specification
				SZ P
1		MTBA9001102	TEMPLATE,MOUNTING	IPLDK-60 BKSU STG WA,Mounting Template(ipLDK-60)
1		APCB9006001	PANEL ASSY,FRONT	IPLDK-60 BKSU STG WA,ipLDK-60 Front Panel Ass'y
1		GTFB0002001	SCREW TAP TITE,PAN B	GTFB0002001,3MM,10MM,SB41(FZY),B,+,TB M3 X10 SZ P
1		GMDY9000301	SCREW MACHINE,FLAT	GMDY9000301(THAILAND),3mm,10mm,SB41(FZY),B,+,M3x10
1		MHHC9027703	HOUSING,UPPER	IPLDK-60 BKSU TUR WB,IPLDK-60 TURKEY UPPER HOUSING
1		MCCB9002801	CAP,DUMMY	AR-BKSU STG WB,ARIA SOHO BBU Rubber Cap
1		MCJF9001601	COVER,CORD	AR-BKSU STG WB,ARIA SOHO Cord Cover
1		MPFD9002801	PLATE,GROUND	AR-BKSU STG WB,ARIA SOHO Ground Plate
1		MLAP9033710	LABEL,UNIT	IPLDK-60 BKSU TUR SV
1		MLAR0003005	LABEL,WARNING	AR-BKSU RUS ZZ
1		MPHY9006801	PROTECTOR	AR-BKSU STG WB,ARIA SOHO Power Cover

5.2 EKSU

Level	Location No	Part No	Description	Specification
1		WSBB9200701	SOFTWARE,FIRMWARE,SYSTEM	F595,V1.1,EPM3128AT100,U120
1		MLAC9006306	LABEL,BARCODE	IPLDK-60 BKSU BRA WA,
1		MLAZ9045001	LABEL	IPLDK-60 BKSU BRA WA,NORTEL MASTER BOX SPEC. LABEL
1		MCJY9002802	COVER,LOWER	IPLDK-60 BKSU STG WB,ipLDK-60 Housing Lower Dummy
1		SAFY9160402	PCB ASSY,MAIN	IPLDK-60 EKSU BRA,MAIN,1.4
.2	U100,U102	SHPY0000101	PHOTOCOUPLER	TLP521-2GR,8PIN,2PORT,GR,DIP
.2	L5	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M,R/TP,ROHS
.2	T1-3	STMY0000301	TRANSFORMER,MATCHING	6170NA0001D,5 PIN,DIP,4H:1H,T 2:1
.2	T11-17,T32	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP
.2	T21-28	STMY0004001	TRANSFORMER,MATCHING	STMY0004001,6 PIN,DIP
.2	Q53,Q55	EQBN0004101	TR,BJT,NPN	ZTX658,TO-92,1W,TP
.2	ZD3	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD,43 V,1500 W,R/TP,TVS,DIODE
.2	RL8-9	EKMY0000101	RELAY,DC	G5N-1A DC24V,6920NB00101
.2	C814	ECFB0000212	CAP,FILM,MPE	0.1uF 250V
.2	PT1-7,PT11-17	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD,6322NB00102
.2	PT35	SETY0000801	THERMISTOR	RXE-F050-2,PTC,RAD
.2	PT36-37	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD,6322NB00102
.2	PT38-43	SETY0000601	THERMISTOR	TRF600-160-0.130,PTC,RAD
.2	MJ1	ENJM0000101	CONN,JACK/PLUG,MODULAR	AR-623G3-S2-GY30,2 PIN,3 JACK,PCB MOUNT,UL/AU50
.2	MJ2	ENJM9012301	CONN,JACK/PLUG,MODULAR	AR-623G8-S4-BK30,4 PIN,8 JACK,RJ11
.2	CN1	ENCY0001101	CONNECTOR,BOX HEADER	2020-50SR-01,50PIN,1.25mm,ANGLE
.2	CN2	ENHY0006301	CONNECTOR,HEADER	JE118-D17T-50,50 PIN,2.54 mm,STRAIGHT,PIN HEADER
.2	CN7	ENGY0000204	CONNECTOR,D-SUB	LWP-1143-07,7PIN,3.96mm,STRAIGHT
.2	CN9	ENHY0001507	CONNECTOR,HEADER	JE117-A25G-06,6 PIN,2.54 mm,STRAIGHT
.2	CN10	ENHY0001606	CONNECTOR,HEADER	JE118-A8G-20,20PIN,2.54mm,STRAIGHT
.2	CN13	ENNY0001604	CONNECTOR,HOUSING TO BOARD	5EHDRC-4P,4PIN,mm,ANGLE

Level	Location No	Part No	Description	Specification
.2	CN16	ENHY0002601	CONNECTOR,HEADER	JE118-A8G-10,10PIN,2.54mm,STRAIGHT,GOLD
.2		GTFB0002001	SCREW TAP TITE,PAN B	GTFB0002001,3 MM,10 MM,SB41(FZY),B,+,TB M3 X10 SZ P
.2		MCJZ0029301	COVER	IPLDK-20 MBU AUS BK,LDK-20 50pin Connector Cover
..3	U8	EUCA9002801	IC,ASIC	ACT-2,0.2,MQFP,240 PIN,ETC
..3	U9-11	EUSY0016901	IC	PEB2466-H,QFP,64PIN.BK,SICOFI-4
..3	U38	EUSY0049101	IC,3A LDO REGULATOR	FAN1587AM33X,TO-263,3 PIN,R/TP,PB-FREE
..3	U40	EUSY0050701	IC,LOW EMI SPECTRUM SPREAD CLOCK	CYIFS781BSXC,SOIC,8 PIN,R/TP
..3	U50	EUSY0130003	IC,DC-DC CONVERTER	NCP1117ST18T3G,SOT-223,3 PIN,R/TP,PB-FREE
..3	U52-53	EUSY0036802	IC,TR ARRAY	KID65003AF,SOIC,16PIN.R/TP
..3	U63	EUSY0037002	IC,,PWM CONTROLLER	TL494CDR2G,SOIC,16 PIN,R/TP,Pb-free
..3	U64	EUSY0004101	IC,,LOGIC COUNTER	MC14017BDR2G,SOIC,16 PIN,R/TP,Pb-free
..3	U65	EUSY0035002	IC,12-STAGE BINARY RIPPLE COUNTER	74HC4040D,SOIC,16PIN.R/TP
..3	U89	EUSY0049701	IC,,OCTAL BUS BUFFER/NON INVERTING	TC74ACT541FT,TSSOP,20 PIN,R/TP
..3	U101,U103,U108,U111	EUSY0037302	IC,,OP AMP	NJM4556M,SOIC,8PIN.R/TP
..3	U104,U109	EUSY0031102	IC,LOGIC	HEF-4066BT,SOIC,14PIN.R/TP
..3	U105,U110,U112	EUSY0036702	IC,,COMPARATOR	LM2903MX,SOIC,8 PIN,R/TP,PB-FREE
..3	U113,U116,U118	EUSY0037302	IC,,OP AMP	NJM4556M,SOIC,8PIN.R/TP
..3	U114,U117	EUSY0036702	IC,,COMPARATOR	LM2903MX,SOIC,8 PIN,R/TP,PB-FREE
..3	U120	EUSP0187701	IC,PBX	EPM3128ATC100-10,TQFP,100 PIN,PLD,192 MHZ,CLOCK 250MHZ
..3	U122	EUSY0078101	IC,DC-TO-DC CONVERTER CONTROL CIRCUITS	MC34063AD,SO-8,8 PIN,R/TP
..3	U123	EUSY0049301	IC,,LOW-VTG QUAD 2-INPUT AND GATE	TC74LCX08FT,TSSOP,14 PIN,R/TP
..3	U124-125	EUSY0049801	IC,LOW VTG OCTAL BUS TRANSCEIVER	TC74LCX245FT,TSSOP,20 PIN,R/TP
..3	X3	EXSY0001201	OSCILLATOR,32.768 MHz	KMS-870R 32.768MHZ,25 PPM,15 pF,SMD,7.0*5.0*1.7
..3	X4	EXSY9022201	OSCILLATOR,100 MHz	BMS-873R,50 PPM,15 pF,SMD,7.0*5.0*1.7
..3	L2	STCY0001002	CHOKE COIL	STCY0001002,0.22 mH,RAD
..3	L3-4	STCY0001301	CHOKE COIL	STCY0001301,0.1 mH,RAD
..3	Q9-10,Q50-51,Q73-80	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	Q11,Q13,Q15	EQBN0004202	TR,BJT,NPN	FZT655,SOT223,2 W,R/TP
..3	Q12,Q14,Q16	EDSY0002801	DIODE,SWITCHING	KDS184-RTK,SOT-23,85V,0.3A,R/TP
..3	Q21-27,Q81	EQBP0001402	TR,BJT,PNP	MMBTA63,SOT-23,0.35W,R/TP
..3	Q31-37,Q72	EQBN0003001	TR,BJT,NPN	MMBTA13,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q52	EQBN0004201	TR,BJT,NPN	FZT653,SOT-223,2W,R/TP
..3	Q54,Q56	EQBP0000801	TR,BJT,PNP	ZTX758,TO-92,1W,TP
..3	Q57-71,Q82-83	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	ZD1,ZD4	EDTY0000501	DIODE,TVS	P6SMBJ6.0A,DO-214AA,6V,600W,R/TP
..3	ZD11-16,ZD21-26	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD41-47,ZD51-59	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD60-67	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D1,D10	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	D11-13	EDTY9009202	DIODE,TVS	P0300SBLRP,DO-214A,25 V,W,R/TP
..3	D21-27,D41-48	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP

Level	Location No	Part No	Description	Specification
..3	D51-58,D142	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D136-138,D141	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB),400 V,1.5 A,R/TP,FAST SWITCHING
..3	BD1-3,BD11-18	EDBY0000601	DIODE,BRIDGE	EDBY0000601(THAILAND),SMD,600V,0.5A,R/TP
..3	LD1	EDLH9012301	DIODE,LED,CHIP	HT-170NB,Blue,ETC,R/TP
..3	RL4-6,RL11-18	EKMY0002801	RELAY,DC	G6K-2F-Y-TR DC4.5V,4.5 V,A,V,A,ohm,2
..3	RL7	EKAY0002601	RELAY,MINIATURE	FTR-C1GA005-G,5 V,1 A,V,A,179 ohm
..3	PT21-28	SETY0000701	THERMISTOR	PSR21083B-2,PTC,RAD
..3	FB8,FB58	SFBH0000401	FILTER,BEAD,CHIP	HH-1M2012-102JT,1000ohm,2012,R/TP
..3	FB11,FB53-57	SFBH0007401	FILTER,BEAD,CHIP	HB-1M1608- 121JT,120 ohm,1608
..3	C140,C300	ECTH0000124	CAP,TANTAL,CHIP	10uF 16V
..3	C141,C301,C303,C305	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C142,C821,C1023	ECTH0000144	CAP,TANTAL,CHIP	100uF 10V
..3	C302,C304,C326,C333	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C306,C320-325	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C307	ECCH0000236	CAP,CERAMIC,CHIP	220pF 50V
..3	C308,C319,C1063	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C312-313,C581-587	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C315,C317,C655,C665	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C318,C1043	ECCH0000218	CAP,CERAMIC,CHIP	22pF 50V
..3	C327-332,C336,C338	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C335,C337,C472,C474	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C339-354,C521-527	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C357-364	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C365-372,C810,C1064	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C375-376,C462-463	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C411-413	ECCH0000356	CAP,CERAMIC,CHIP	10nF 50V
..3	C421-423	ECTH0000136	CAP,TANTAL,CHIP	33uF 10V
..3	C431-433	ECES0000102	CAP,AL ELEC,SMD	2.2uF 50V
..3	C441-443,C451-453	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C461,C464,C467	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C468,C653,C658-660	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C469,C571,C573,C575	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C471,C473,C475,	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C476,C642-647,C661	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C501-507,C511-517	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C541-547,C1033	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C551-557,C1035	ECCH0000358	CAP,CERAMIC,CHIP	15nF 50V
..3	C561-567,C691,C1031	ECES0000120	CAP,AL ELEC,SMD	4.7uF 50V
..3	C577,C611,C613,C615	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C591-597,C780,C812	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C601-607,C1030	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C617,C631,C633,C635	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C621-627,C712,C714	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C637,C685-686,C690	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V

Level	Location No	Part No	Description	Specification
..3	C641	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C650,C761-768,C809	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C654,C664,C681	ECCH0000282	CAP,CERAMIC,CHIP	560pF 25V
..3	C656,C666,C683	ECCH0000247	CAP,CERAMIC,CHIP	1nF 50V
..3	C657,C667,C684	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C662,C672,C689	ECCH0000274	CAP,CERAMIC,CHIP	0.22uF 16V
..3	C663,C668-670,C673	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C671,C688,C1027	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C680,C687,C722,C731	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C682,C1060-1062	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C692,C815,C850,C895	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C701-706	ECCH0008201	CAP,CERAMIC,CHIP	47000pF 200V
..3	C716,C992-994,C1029	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C721,C723,C725	ECCH0000220	CAP,CERAMIC,CHIP	27pF 50V
..3	C741-748,C751-758	ECCH0000345	CAP,CERAMIC,CHIP	1.5nF 50V
..3	C771-778,C1036-1037	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C779,C987,C989,C1059	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C811	ECCH0000347	CAP,CERAMIC,CHIP	2nF 50V
..3	C813,C817	ECCM0000227	CAP,CERAMIC,MLC	100pF 500V
..3	C816	ECET0000514	CAP,AL ELEC	10uF 100V
..3	C910-949,C1034	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C996-1003,C1025	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C1013-1021,C1032	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C1022	ECCH0000339	CAP,CERAMIC,CHIP	470pF 50V
..3	C1026,C1045-1050	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C1028	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C1038	ECCH0000250	CAP,CERAMIC,CHIP	1.8nF 50V
..3	C1039,C1066-1067	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C1040-1042	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C1051-1058	ECCH0000247	CAP,CERAMIC,CHIP	1nF 50V
..3	R100-101,R253	ERHY0000412	RES,CHIP	33 1/16W
..3	R284-285,R287	ERHY0000466	RES,CHIP	10K 1/16W
..3	R288-293	ERHY0000491	RES,CHIP	200K 1/16W
..3	R294-295,R715-718	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R324-325,R360-388	ERHY0000412	RES,CHIP	33 1/16W
..3	R389,R723,R726-727	ERHY0000420	RES,CHIP	68 1/16W
..3	R390-391,R711-712	ERHY0000412	RES,CHIP	33 1/16W
..3	R394,R396,R398-399	ERHY0000401	RES,CHIP	0 1/16W
..3	R401-406,R442,R444	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R400,R710,R868	ERHY0000967	RES,CHIP	4.7K 1/10W
..3	R411,R413,R415	ERHY0001813	RES,CHIP	15K 1W
..3	R421-426,R938-939	ERHY0000925	RES,CHIP	68 1/10W
..3	R431,R433,R435	ERHY0000952	RES,CHIP	1K 1/10W
..3	R441,R443,R445	ERHY0000976	RES,CHIP	12K 1/10W

Level	Location No	Part No	Description	Specification
..3	R446,R501-507	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R451,R453,R455	ERHY0000958	RES,CHIP	2K 1/10W
..3	R452,R454,R456	ERHY0000985	RES,CHIP	30K 1/10W
..3	R461,R463,R465	ERHY0001413	RES,CHIP	200 1/4W
..3	R462,R464,R466	ERHY0000933	RES,CHIP	150 1/10W
..3	R471,R473,R475	ERHY0000975	RES,CHIP	10K 1/10W
..3	R472,R474,R476	ERHY0000481	RES,CHIP	56K 1/16W
..3	R481,R483,R485	ERHY0000468	RES,CHIP	15K 1/16W
..3	R482,R484,R486	ERHY0000474	RES,CHIP	30K 1/16W
..3	R511-517,R774,R785	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R521-527,R1555	ERHY0001902	RES,CHIP	1K 1/2W
..3	R531-537,R991,R1554	ERHY0001707	RES,CHIP	510 1/2W
..3	R541-547,R578	ERHY0014601	RES,CHIP	300 1/2W
..3	R551-557,R611-617	ERHY0000672	RES,CHIP	30K 1/10W
..3	R561-567,R601-607	ERHY0000663	RES,CHIP	15K 1/10W
..3	R571-577,R1551	ERHY0000952	RES,CHIP	1K 1/10W
..3	R591-597,R1560	ERHY0000968	RES,CHIP	5.1K 1/10W
..3	R581-587,R1553	ERHY0000697	RES,CHIP	300K 1/10W
..3	R631-637,R1546	ERHY0014601	RES,CHIP	300 1/2W
..3	R641-647,R691-697	ERHY0000466	RES,CHIP	10K 1/16W
..3	R651-657,R871,R873	ERHY0000975	RES,CHIP	10K 1/10W
..3	R661-667,R1559	ERHY0000626	RES,CHIP	620 1/10W
..3	R671-677,R1561	ERHY0000479	RES,CHIP	47K 1/16W
..3	R681-687,R1556	ERHY0000901	RES,CHIP	0 1/10W
..3	R701-707,R1537	ERHY0000474	RES,CHIP	30K 1/16W
..3	R713-714,R1631,R1633	ERHY0000401	RES,CHIP	0 1/16W
..3	R728-759	ERHY0000433	RES,CHIP	300 1/16W
..3	R764,R1002	ERHY0000632	RES,CHIP	1.2K 1/10W
..3	R765	ERHY0010001	RES,CHIP	270 1/10W
..3	R766	ERHY0000666	RES,CHIP	20K 1/10W
..3	R767,R1549-1550	ERHY0000663	RES,CHIP	15K 1/10W
..3	R768-769	ERHY0000665	RES,CHIP	18K 1/10W
..3	R770,R1577	ERHY0000918	RES,CHIP	33 1/10W
..3	R771	ERHY0000910	RES,CHIP	10 1/10W
..3	R772	ERHY0000425	RES,CHIP	100 1/16W
..3	R773	ERHY0000454	RES,CHIP	3.3K 1/16W
..3	R776,R779	ERHY0000959	RES,CHIP	2.2K 1/10W
..3	R784,R786,R790,R794	ERHY0000466	RES,CHIP	10K 1/16W
..3	R787,R841-848	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R791,R795,R1599-1630	ERHY0000420	RES,CHIP	68 1/16W
..3	R801,R803,R805	ERHY0001429	RES,CHIP	15K 1/4W
..3	R802,R804,R806,R971	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R811,R813,R815	ERHY0000466	RES,CHIP	10K 1/16W
..3	R822,R824,R826	ERHY0000483	RES,CHIP	68K 1/16W

Level	Location No	Part No	Description	Specification
..3	R831,R833,R835	ERHY0000496	RES,CHIP	330K 1/16W
..3	R849-850	ERHY0000340	RES,CHIP	10K 1/16W
..3	R867,R1568	ERHY0000973	RES,CHIP	8.2K 1/10W
..3	R869	ERHY0000974	RES,CHIP	9.1K 1/10W
..3	R870	ERHY0001023	RES,CHIP	1.0M 1/10W
..3	R872	ERHY0000990	RES,CHIP	47K 1/10W
..3	R874,R882,R884,R890	ERHY0000991	RES,CHIP	51K 1/10W
..3	R875-877,R886	ERHY0000975	RES,CHIP	10K 1/10W
..3	R878,R883	ERHY0000999	RES,CHIP	100K 1/10W
..3	R879-880,R885,R891	ERHY0001608	RES,CHIP	200 1/2W
..3	R881	ERHY0001605	RES,CHIP	100 1/2W
..3	R887	ERHY0000945	RES,CHIP	560 1/10W
..3	R888-889,R1562,R1567	ERHY0000975	RES,CHIP	10K 1/10W
..3	R943-944	ERHY0001402	RES,CHIP	0 1/4W
..3	R952	ERHY0000367	RES,CHIP	100K 1/16W
..3	R954	ERHY0000342	RES,CHIP	12K 1/16W
..3	R955,R957,R959	ERHY0000428	RES,CHIP	180 1/16W
..3	R956,R958,R960	ERHY0000405	RES,CHIP	10 1/16W
..3	R978,R1578-1596	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R984-990,R1536	ERHY0000917	RES,CHIP	30 1/10W
..3	R992-998,R1552	ERHY0000988	RES,CHIP	39K 1/10W
..3	R999-1001	ERHY0000903	RES,CHIP	1 1/10W
..3	R1003	ERHY0000673	RES,CHIP	33K 1/10W
..3	R1004	ERHY0000621	RES,CHIP	330 1/10W
..3	R1010-1011	ERHY0000466	RES,CHIP	10K 1/16W
..3	R1530,R1533	ERHY0000963	RES,CHIP	3.3K 1/10W
..3	R1531-1532	ERHY0000967	RES,CHIP	4.7K 1/10W
..3	R1534-1535,R1597	ERHY0000466	RES,CHIP	10K 1/16W
..3	R1538-1545	ERHY0000985	RES,CHIP	30K 1/10W
..3	R1547-1548	ERHY0000672	RES,CHIP	30K 1/10W
..3	R1557-1558,R1632	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R1565	ERHY0000982	RES,CHIP	22K 1/10W
..3	R1566	ERHY0000962	RES,CHIP	3K 1/10W
..3	R1569-1571	ERHY0000410	RES,CHIP	22 1/16W
..3	R1572-1575	ERHY0000429	RES,CHIP	200 1/16W
..3	R1576	ERHY0000925	RES,CHIP	68 1/10W
..3	R1634,R1636,R1638	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R1635,R1637,R1639	ERHY0000401	RES,CHIP	0 1/16W
..3	R1640,R1642	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R1641,R1643,R1645	ERHY0000401	RES,CHIP	0 1/16W
..3	R1644,R1646	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	T30	STMY0000601	TRANSFORMER,MATCHING	STMY601,8 PIN,DIP,RING
.2	C401-403,C820	ECFB0000302	CAP,FILM,MPE	1uF 250V
.2	AR1-3	SEAY0000301	ARRESTOR	T83-A350X,350 V,RAD

Level	Location No	Part No	Description	Specification
1		SSPD9003003	POWER SUPPLY,AC-DC	NT80-M
1		MLAR0003005	LABEL,WARNING	AR-BKSU RUS ZZ
1		MLDY9007201	LIGHT PIPE	AR-BKSU STG WB,ARIA SOHO Light Pipe
1		ABAZ0007417	BAG ASSY	IPLDK-60 EKSU STG ZZ,ipLDK-60 EKSU Bag Ass'y
.2		ABAZ0005001	BAG ASSY	V70 EKSU UVT ZZ
.2		ABAZ0005002	BAG ASSY	IPLDK-60 EKSU STG BK,ipLDK-60 Rubber Foot Bag Ass'y
.2		ABEA0000101	BOX ASSY,BASIC	ZZ,C39365-A9925-B503
.2		ACDY9001601	CHAMP CABLE ASSY	IPLDK-60 EKSU STG GR,Champ Cable Ass'y (Nortel-1248)
.2		BTBA0000101	TIE,CABLE	BTBA0000101,SH-190
.2		MBAD0002406	BAG,VINYL(PE)	ZZ,K/P STATION H/S X DX A
.2		SWPY0005401	POWER CORD ASSY	M2511A,V1625A,CORE,H05VV-F 3*,1850mm,BK,EUROPEAN APPROVED,VDE
.2		SWWA0000101	WIRE ASSY	SWWA0000101,3600 mm,4 LINE,16,UL1015
.2		ABAZ0006906	BAG ASSY	AR-BKSU MEX ZZ
.2		ENNY0001602	CONNECTOR,HOUSING TO BOARD	5ESDV-0275,4PIN,mm,ANGLE
.2		SWWA9059701	WIRE ASSY	SH_LG_06_01,350 mm,1 LINE,3.2,SH-LG-06-01
1		MPFD9002801	PLATE,GROUND	AR-BKSU STG WB,ARIA SOHO Ground Plate
1		ABEZ9070201	BOX ASSY	IPLDK-60 BKSU TUR ZZ
.2		MBEE9064001	BOX,MASTER	IPLDK-60 BKSU STG ZZ
.2		MBEF9110301	BOX,UNIT	IPLDK-60 BKSU TUR ZZ
.2		MPAD9007301	PACKING,SHELL	LDK-1248 BKSU RUS ZZ
.2		MBAD0002404	BAG,VINYL(PE)	ZZ,K/P X DX A
1		MPHY9006801	PROTECTOR	AR-BKSU STG WB,ARIA SOHO Power Cover
1		AHDA9028301	HOUSING ASSY,LOWER	IPLDK-60 BKSU STG WA,ipLDK-60 Housing Lower Ass'y
1		MSAZ9033603	SHEET	AR-EKSU STG WB,ARIA SOHO EMBU Sheet
1		APCB9006001	PANEL ASSY,FRONT	IPLDK-60 BKSU STG WA,ipLDK-60 Front Panel Ass'y
1		MSAZ9033701	SHEET	AR-EKSU STG WB,ARIA SOHO Blank Sheet
1		GMDY9000301	SCREW MACHINE,FLAT	GMDY9000301(THAILAND),3mm,10mm,SB41(FZY),B,+,M3x10 Pan Flat
1		MTBA9001102	TEMPLATE,MOUNTING	IPLDK-60 BKSU STG WA,Mounting Template(ipLDK-60)
1		GMFY0001801	SCREW MACHINE,PAN	GMFY0001801,3 MM,6 MM,SB41(FZY),B,+,KB1023 M3 X 6 SZ P
1		GTFB0002001	SCREW TAP TITE,PAN B	GTFB0002001,3 MM,10 MM,SB41(FZY),B,+,TB M3 X10 SZ P
1		MCCB9002801	CAP,DUMMY	AR-BKSU STG WB,ARIA SOHO BBU Rubber Cap
1		MCJF9001601	COVER,CORD	AR-BKSU STG WB,ARIA SOHO Cord Cover
1		MHHC9027703	HOUSING,UPPER	IPLDK-60 BKSU TUR WB,IPLDK-60 TURKEY UPPER HOUSING
1		MLAP9033711	LABEL,UNIT	IPLDK-60 EKSU TUR SV

5.3 CHB308

Level	Location No	Part No	Description	Specification
1		MLAC9006306	LABEL,BARCODE	IPLDK-60 BKSU BRA WA
1		MLAZ9045001	LABEL	IPLDK-60 BKSU BRA WA,NORTEL MASTER BOX SPEC. LABEL
1		SAGY9250202	CHB308 PCB ASSY,OPTION	IPLDK-60 CHB308 BRA,OPTION,1.4
.2	U100,U102	SHPY0000101	PHOTOCOUPLER	TLP521-2GR,8PIN,2PORT,GR,DIP,
.2	T1-3	STMY0000301	TRANSFORMER,MATCHING	6170NA0001D,5 PIN,DIP,4H:1H,T 2:1
.2	T11-18	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP
.2	T21-28	STMY0004001	TRANSFORMER,MATCHING	STMY0004001,6 PIN,DIP
.2	L3	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M,R/TP,ROHS
.2	ZD61	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD,43 V,1500 W,R/TP,TVS,DIODE
.2	AR1-3	SEAY0000301	ARRESTOR	T83-A350X,350 V,RAD
.2	PT1-8,PT11-18	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD
.2	C101-103	ECFB0000302	CAP,FILM,MPE	1uF 250V
.2	CN1	ENSY9017201	CONN,SOCKET	JE610-A254-G50V,50 PIN,STRAIGHT,2.54 mm
.2	CN2	ENHY0001507	CONNECTOR,HEADER	JE117-A25G-06,6 PIN,2.54 mm,STRAIGHT
.2	CN3	ENHY0001606	CONNECTOR,HEADER	JE118-A8G-20,20PIN,2.54mm,STRAIGHT
.2	MJ1	ENJM0000101	CONN,JACK/PLUG,MODULAR	AR-623G3-S2-GY30,2 PIN,3 JACK,PCB MOUNT,UL/AU50
.2	MJ2	ENJM9012301	CONN,JACK/PLUG,MODULAR	AR-623G8-S4-BK30,4 PIN,8 JACK,RJ11
..3	U1-3	EUSY0016901	IC	PEB2466-H,QFP,64PIN.BK,SICOFI-4
..3	U4-5	EUSY0036802	IC,TR ARRAY	KID65003AF,SOIC,16PIN.R/TP
..3	U6	EUSY0050801	IC,LOW VTG 3-TO-8 LINE DECODER	TC74LCX138FT,TSSOP,16 PIN,R/TP
..3	U7-8,U10	EUSY0062001	IC,OCTAL D-TYPE FLIP-FLOP 3-STATE OUTPUT	TC74ACT574FT,TSSOP,20 PIN,R/TP
..3	U9,U11,U13	EUSY0085301	IC,LOW VOLTAGE CMOS OCTAL BUFFER	MC74LCX541DTR2G,TSSOP,20 PIN,R/TP,3-STATE
..3	U14	EUSY0049401	IC,LOW-VTG QUAD 2-INPUT OR GATE	TC74LCX32FT,TSSOP,14 PIN,R/TP
..3	U101,U103-104,U111	EUSY0037302	IC,OP AMP	NJM4556M,SOIC,8PIN.R/TP
..3	U105,U151	EUSY0031102	IC	HEF-4066BT,SOIC,14PIN.R/TP,LOGIC
..3	U110,U112,U114,U116	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,R/TP,PB-FREE
..3	U113,U115,U117	EUSY0037302	IC,OP AMP	NJM4556M,SOIC,8PIN.R/TP
..3	U152	EUSY0078101	IC,DC-TO-DC CONVERTER CONTROL CIRCUITS	MC34063AD,SO-8,8 PIN,R/TP
..3	L1-2	STCY0001301	CHOKE COIL	STCY0001301,0.1 mH,RAD
..3	Q11,Q13,Q15	EQBN0004202	TR,BJT,NPN	FZT655,SOT223,2 W,R/TP
..3	Q12,Q14,Q16	EDSY0002801	DIODE,SWITCHING	KDS184-RTK,SOT-23,85V,0.3A,R/TP
..3	Q21-28	EQBP0001402	TR,BJT,PNP	MMBTA63,SOT-23,0.35W,R/TP
..3	Q31-38	EQBN0003001	TR,BJT,NPN	MMBTA13,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q39-54	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	Q101-108	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	ZD11-16,ZD21-26	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD41-48,ZD51-58	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD101-108	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D11-13	EDTY9009202	DIODE,TVS	P0300SBLRP,DO-214A,25 V,W,R/TP

Level	Location No	Part No	Description	Specification
..3	D21-28,D41-48,D51-58	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D60	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB),400 V,1.5 A,R/TP,FAST SWITCHING
..3	BD1-3,BD11-18	EDBY0000601	DIODE,BRIDGE	EDBY0000601(THAILAND),SMD,600V,0.5A,R/TP
..3	LD1	EDLH9012301	DIODE,LED,CHIP	HT-170NB,Blue,ETC,R/TP
..3	PT21-28	SETY0000701	THERMISTOR	PSR21083B-2,PTC,RAD,ED9705-T
..3	RL4-6,RL11-18	EKMY0002801	RELAY,DC	G6K-2F-Y-TR DC4.5V,4.5 V,A,V,A,ohm,2
..3	RL7	EKAY0002601	RELAY,MINIATURE	FTR-C1GA005-G,5 V,1 A,V,A,179 ohm
..3	C1-7,C9,C20,C271	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C14,C724-725	ECTH0000146	CAP,TANTAL,CHIP	100uF 16V
..3	C111-113	ECCH0000356	CAP,CERAMIC,CHIP	10nF 50V
..3	C121-123	ECTH0000136	CAP,TANTAL,CHIP	33uF 10V
..3	C131-133	ECES0000102	CAP,AL ELEC,SMD	2.2uF 50V
..3	C141-143,C221-228	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C151-153,C291-298	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C161,C164,C167	ECCH0000231	CAP,CERAMIC,CHIP	100 pF,50V,J,NP0,TC,1608,R/TP
..3	C162-163,C168-169	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C171,C173,C175	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C172,C174,C176	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C201-208,C211-218	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C241-248,C417	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C251-258	ECCH0000358	CAP,CERAMIC,CHIP	15nF 50V
..3	C261-268,C467	ECES0000120	CAP,AL ELEC,SMD	4.7uF 50V
..3	C273,C275,C277,C331	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C281-288	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C301-308	ECCH0000231	CAP,CERAMIC,CHIP	100 pF,50V,J,NP0,TC,1608,R/TP
..3	C311,C313,C315,C317	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C321-328,C511-516	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C333,C335,C337	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C341-348	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C400,C561-568	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C403,C407,C413,C415	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C404-405,C421-422	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C406,C423,C452	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	C412,C414,C420,C429	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C416,C433,C462	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C419,C424,C430,C432	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C431,C437,C458	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C434,C463	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C436,C453,C459,C461	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C450-451,C600-602	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C460,C466	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C465,C468,C522,C531	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V

Level	Location No	Part No	Description	Specification
..3	C501-506	ECCH0008201	CAP,CERAMIC,CHIP	47000pF 200V
..3	C521,C523,C525	ECCH0000220	CAP,CERAMIC,CHIP	27pF 50V
..3	C541-548,C551-558	ECCH0000345	CAP,CERAMIC,CHIP	1.5nF 50V
..3	C571-578	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C590,C722-723	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C591	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C726-735	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C736	ECCH0000339	CAP,CERAMIC,CHIP	470pF 50V
..3	C737	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C738-741	ECCH0000318	CAP,CERAMIC,CHIP	33pF 50V
..3	R1-22,R121-126	ERHY0000925	RES,CHIP	68 1/10W
..3	R23,R101-106,R142	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R24,R381-388	ERHY0000901	RES,CHIP	0 1/10W
..3	R44-49,R171,R173	ERHY0000466	RES,CHIP	10K 1/16W
..3	R50-54,R56,R767	ERHY0000412	RES,CHIP	33 1/16W
..3	R55	ERHY0000441	RES,CHIP	680 1/16W
..3	R111,R113,R115	ERHY0001813	RES,CHIP	15K 1W
..3	R131,R133,R135	ERHY0000952	RES,CHIP	1K 1/10W
..3	R141,R143,R145	ERHY0000976	RES,CHIP	12K 1/10W
..3	R144,R146,R201-208	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R151,R153,R155	ERHY0000958	RES,CHIP	2K 1/10W
..3	R152,R154,R156	ERHY0000985	RES,CHIP	30K 1/10W
..3	R161,R163,R165	ERHY0001413	RES,CHIP	200 1/4W
..3	R162,R164,R166	ERHY0000427	RES,CHIP	150 1/16W
..3	R172,R174,R176	ERHY0000481	RES,CHIP	56K 1/16W
..3	R175,R341-348	ERHY0000466	RES,CHIP	10K 1/16W
..3	R181,R183,R185	ERHY0000468	RES,CHIP	15K 1/16W
..3	R182,R184,R186	ERHY0000474	RES,CHIP	30K 1/16W
..3	R211-218,R641-648	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R221-228	ERHY0001902	RES,CHIP	1K 1/2W
..3	R231-238,R668	ERHY0001707	RES,CHIP	510 1/2W
..3	R241-248,R331-338	ERHY0014601	RES,CHIP	300 1/2W
..3	R251-258,R311-318	ERHY0000672	RES,CHIP	30K 1/10W
..3	R261-268,R301-308	ERHY0000663	RES,CHIP	15K 1/10W
..3	R271-278	ERHY0000952	RES,CHIP	1K 1/10W
..3	R281-288	ERHY0000697	RES,CHIP	300K 1/10W
..3	R291-298	ERHY0000968	RES,CHIP	5.1K 1/10W
..3	R351-358,R391-398	ERHY0000466	RES,CHIP	10K 1/16W
..3	R361-368	ERHY0000626	RES,CHIP	620 1/10W
..3	R371-378	ERHY0000479	RES,CHIP	47K 1/16W
..3	R401-408	ERHY0000474	RES,CHIP	30K 1/16W
..3	R501	ERHY0000367	RES,CHIP	100K 1/16W
..3	R503	ERHY0000342	RES,CHIP	12K 1/16W
..3	R504,R506,R508	ERHY0000934	RES,CHIP	180 1/10W

Level	Location No	Part No	Description	Specification
..3	R505,R507,R509	ERHY0000405	RES,CHIP	10 1/16W
..3	R601-603	ERHY0001429	RES,CHIP	15K 1/4W
..3	R604-606	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R611,R613,R615	ERHY0000466	RES,CHIP	10K 1/16W
..3	R622,R624,R626	ERHY0000483	RES,CHIP	68K 1/16W
..3	R631,R633,R635	ERHY0000496	RES,CHIP	330K 1/16W
..3	R651-652	ERHY0000659	RES,CHIP	10K 1/10W
..3	R653,R720-721	ERHY0001402	RES,CHIP	0 1/4W
..3	R654-661	ERHY0000917	RES,CHIP	30 1/10W
..3	R662-663,R751,R753	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R664-665	ERHY0000466	RES,CHIP	10K 1/16W
..3	R666-667,R752,R754	ERHY0000401	RES,CHIP	0 1/16W
..3	R669-676	ERHY0000988	RES,CHIP	39K 1/10W
..3	R677-679	ERHY0000903	RES,CHIP	1 1/10W
..3	R680	ERHY0000632	RES,CHIP	1.2K 1/10W
..3	R681	ERHY0000673	RES,CHIP	33K 1/10W
..3	R682	ERHY0000621	RES,CHIP	330 1/10W
..3	R701-708	ERHY0000985	RES,CHIP	30K 1/10W
..3	R755,R757,R759	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R756,R758,R760	ERHY0000401	RES,CHIP	0 1/16W
..3	R761,R763,R765	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R762,R764,R766	ERHY0000401	RES,CHIP	0 1/16W
.2	PT101-106	SETY0000601	THERMISTOR	TRF600-160-0.130,PTC,RAD
1		ABAZ0007310	BAG ASSY	IPLDK-60 CHB308 STG ZZ,ipLDK-60 CHB308 Bag Ass'y
1		ABEZ9066302	BOX ASSY	IPLDK-60 SLU8 STG ZZ
.2		MBAA9001803	BAG,AIR CAP	AR-SLIB8 STG ZZ
.2		MBAD9008303	BAG,VINYL(PE)	AR-MBU STG ZZ,0.06t X 270 X 350
.2		MBEE0001502	BOX,MASTER	AR-CHB308 STG ZZ
.2		MBEF9105701	BOX,UNIT	AR-SLIB8 STG ZZ

5.4 CSB316

Level	Location No	Part No	Description	Specification
1		SAGY9250302	CSB316 PCB ASSY,OPTION	IPLDK-60 CSB316 BRA,OPTION,1.4
.2	T1-3	STMY0000301	TRANSFORMER,MATCHING	6170NA0001D,5 PIN,DIP,4H:1H,T 2:1
.2	L3	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M,R/TP,ROHS
.2	ZD61	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD,43 V,1500 W,R/TP,TVS,DIODE
.2	C101-103	ECFB0000302	CAP,FILM,MPE	1uF 250V
.2	CN1	ENSY9017201	CONN,SOCKET	JE610-A254-G50V,50 PIN,STRAIGHT,2.54 mm
..3	U1-3	EUSY0016901	IC	PEB2466-H,QFP,64PIN.BK,SICOFI-4
..3	U4-5	EUSY0036802	IC	KID65003AF,SOIC,16PIN.R/TP,TR ARRAY

Level	Location No	Part No	Description	Specification
..3	U6	EUSY0050801	IC,LOW VTG 3-TO-8 LINE DECODER	TC74LCX138FT,TSSOP,16 PIN,R/TP
..3	U7-8,U10,U21	EUSY0062001	IC,OCTAL D-TYPE FLIP-FLOP 3-STATE OUTPUT	TC74ACT574FT,TSSOP,20 PIN,R/TP
..3	U9,U11,U13,U22	EUSY0085301	IC,LOW VOLTAGE CMOS OCTAL BUFFER	MC74LCX541DTR2G,TSSOP,20 PIN,R/TP,3-STATE
..3	U14	EUSY0049401	IC,LOW-VTG QUAD 2-INPUT OR GATE	TC74LCX32FT,TSSOP,14 PIN,R/TP
..3	U101,U103-104,U111	EUSY0037302	IC	NJM4556M,SOIC,8PIN.R/TP,OP AMP
..3	U105,U151	EUSY0031102	IC	HEF-4066BT,SOIC,14PIN.R/TP,LOGIC
..3	U110,U112,U114,U116	EUSY0036702	IC	LM2903MX,SOIC,8 PIN,R/TP,COMPARATOR,PB-FREE
..3	U113,U115,U117	EUSY0037302	IC	NJM4556M,SOIC,8PIN.R/TP,OP AMP
..3	U152	EUSY0078101	IC,DC-TO-DC CONVERTER CONTROL CIRCUITS	MC34063AD,SO-8,8 PIN,R/TP
..3	U153	EUSY0049701	IC,OCTAL BUS BUFFER/NON INVERTING	TC74ACT541FT,TSSOP,20 PIN,R/TP
..3	Q11,Q13,Q15	EQBN0004202	TR,BJT,NPN	FZT655,SOT223,2 W,R/TP
..3	Q12,Q14,Q16	EDSY0002801	DIODE,SWITCHING	KDS184-RTK,SOT-23,85V,0.3A,R/TP
..3	Q21-28	EQBP0001402	TR,BJT,PNP	MMBTA63,SOT-23,0.35W,R/TP
..3	Q31-38	EQBN0003001	TR,BJT,NPN	MMBTA13,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q39-54	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	Q101-108	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	L1-2	STCY0001301	CHOKE COIL	STCY0001301,0.1 mH,RAD
..3	ZD11-16,ZD21-26	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD41-48,ZD51-58	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD101-108	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D11-13	EDTY9009202	DIODE,TVS	P0300SBLRP,DO-214A,25 V,W,R/TP
..3	D21-28	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D30	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB),400 V,1.5 A,R/TP,FAST SWITCHING
..3	BD1-3,BD11-18	EDBY0000601	DIODE,BRIDGE	EDBY0000601(THAILAND),SMD,600V,0.5A,R/TP
..3	LD1	EDLH9012301	DIODE,LED,CHIP	HT-170NB,Blue,ETC,R/TP
..3	RL4-6,RL11-18	EKMY0002801	RELAY,DC	G6K-2F-Y-TR DC4.5V,4.5 V,A,V,A,ohm,2
..3	RL7	EKAY0002601	RELAY,MINIATURE	FTR-C1GA005-G,5 V,1 A,V,A,179 ohm
..3	C1-7,C9,C11-12	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C14,C724-725	ECTH0000146	CAP,TANTAL,CHIP	100uF 16V
..3	C111-113	ECCH0000356	CAP,CERAMIC,CHIP	10nF 50V
..3	C121-123	ECTH0000136	CAP,TANTAL,CHIP	33uF 10V
..3	C131-133	ECES0000102	CAP,AL ELEC,SMD	2.2uF 50V
..3	C141-143,C221-228	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C151-153,C291-298	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C161,C164,C167	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C162-163,C168-169	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C171,C173,C175	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C172,C174,C176	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C197,C271,C273,C275	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C201-208,C211-218	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C241-248,C417	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V

Level	Location No	Part No	Description	Specification
..3	C251-258	ECCH0000358	CAP,CERAMIC,CHIP	15nF 50V
..3	C261-268,C467	ECES0000120	CAP,AL ELEC,SMD	4.7uF 50V
..3	C277,C311,C313,C315	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C281-288	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C301-308	ECCH0000327	CAP,CERAMIC,CHIP	100pF 50V
..3	C317,C468,C522,C531	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C321-328,C511-516	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C331,C333,C335,C337	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C341-348	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C403,C407,C413,C415	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C404-405,C421-422	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C406,C423,C452	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	C412,C414,C420,C429	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C416,C433,C462	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C419,C424,C430,C432	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C431,C437,C458	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C434,C463	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C436,C453,C459	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C450-451,C600-602	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C460,C466	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C461,C465	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C501-506	ECCH0008201	CAP,CERAMIC,CHIP	47000pF 200V
..3	C521,C523,C525	ECCH0000220	CAP,CERAMIC,CHIP	27pF 50V
..3	C590,C722,C726,C738	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C591	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C723,C727-736	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C737	ECCH0000339	CAP,CERAMIC,CHIP	470pF 50V
..3	C739	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C740-743	ECCH0000318	CAP,CERAMIC,CHIP	33pF 50V
..3	C744-749	ECCH0000222	CAP,CERAMIC,CHIP	33pF 50V
..3	C750-757	ECCH0000247	CAP,CERAMIC,CHIP	1nF 50V
..3	R1-13	ERHY0000420	RES,CHIP	68 1/16W
..3	R14-22,R63-67	ERHY0000412	RES,CHIP	33 1/16W
..3	R23-24	ERHY0000901	RES,CHIP	0 1/10W
..3	R48-54,R56-62,R171	ERHY0000466	RES,CHIP	10K 1/16W
..3	R68	ERHY0000441	RES,CHIP	680 1/16W
..3	R69-71,R724-731	ERHY0000412	RES,CHIP	33 1/16W
..3	R101-106,R142,R144	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R111,R113,R115	ERHY0001813	RES,CHIP	15K 1W
..3	R121-126	ERHY0000925	RES,CHIP	68 1/10W
..3	R131,R133,R135	ERHY0000952	RES,CHIP	1K 1/10W
..3	R141,R143,R145	ERHY0000976	RES,CHIP	12K 1/10W
..3	R146,R201-208	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R151,R153,R155	ERHY0000958	RES,CHIP	2K 1/10W

Level	Location No	Part No	Description	Specification
..3	R152,R154,R156	ERHY0000985	RES,CHIP	30K 1/10W
..3	R161,R163,R165	ERHY0001413	RES,CHIP	200 1/4W
..3	R162,R164,R166	ERHY0000933	RES,CHIP	150 1/10W
..3	R172,R174,R176	ERHY0000481	RES,CHIP	56K 1/16W
..3	R173,R175,R341-348	ERHY0000466	RES,CHIP	10K 1/16W
..3	R181,R183,R185	ERHY0000468	RES,CHIP	15K 1/16W
..3	R182,R184,R186	ERHY0000474	RES,CHIP	30K 1/16W
..3	R211-218,R663-664	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R221-228	ERHY0001902	RES,CHIP	1K 1/2W
..3	R231-238,R710	ERHY0001707	RES,CHIP	510 1/2W
..3	R241-248,R331-338	ERHY0014601	RES,CHIP	300 1/2W
..3	R251-258,R311-318	ERHY0000672	RES,CHIP	30K 1/10W
..3	R261-268,R301-308	ERHY0000663	RES,CHIP	15K 1/10W
..3	R271-278	ERHY0000952	RES,CHIP	1K 1/10W
..3	R281-288	ERHY0000697	RES,CHIP	300K 1/10W
..3	R291-298	ERHY0000968	RES,CHIP	5.1K 1/10W
..3	R351-358,R611,R613	ERHY0000466	RES,CHIP	10K 1/16W
..3	R361-368	ERHY0000626	RES,CHIP	620 1/10W
..3	R371-378	ERHY0000479	RES,CHIP	47K 1/16W
..3	R381-388,R668-669	ERHY0000901	RES,CHIP	0 1/10W
..3	R391-398	ERHY0000975	RES,CHIP	10K 1/10W
..3	R401-408	ERHY0000474	RES,CHIP	30K 1/16W
..3	R501	ERHY0000367	RES,CHIP	100K 1/16W
..3	R503	ERHY0000342	RES,CHIP	12K 1/16W
..3	R504,R506,R508	ERHY0000934	RES,CHIP	180 1/10W
..3	R505,R507,R509	ERHY0000405	RES,CHIP	10 1/16W
..3	R601-603	ERHY0001429	RES,CHIP	15K 1/4W
..3	R604-606	ERHY0000967	RES,CHIP	4.7K 1/10W
..3	R615,R653,R665-667	ERHY0000466	RES,CHIP	10K 1/16W
..3	R622,R624,R626	ERHY0000483	RES,CHIP	68K 1/16W
..3	R631,R633,R635	ERHY0000496	RES,CHIP	330K 1/16W
..3	R651-652	ERHY0000659	RES,CHIP	10K 1/10W
..3	R654,R720-721	ERHY0001402	RES,CHIP	0 1/4W
..3	R655-662	ERHY0000917	RES,CHIP	30 1/10W
..3	R670-677	ERHY0000988	RES,CHIP	39K 1/10W
..3	R678	ERHY0000621	RES,CHIP	330 1/10W
..3	R679-681	ERHY0000903	RES,CHIP	1 1/10W
..3	R682	ERHY0000632	RES,CHIP	1.2K 1/10W
..3	R683	ERHY0000673	RES,CHIP	33K 1/10W
..3	R701-708	ERHY0000985	RES,CHIP	30K 1/10W
..3	R722-723,R751,R753	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R752,R754,R756,R758	ERHY0000401	RES,CHIP	0 1/16W
..3	R755,R757,R759	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R760,R762,R764,R766	ERHY0000401	RES,CHIP	0 1/16W

Level	Location No	Part No	Description	Specification
..3	R761,R763,R765	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	U100,U102	SHPY0000101	PHOTOCOUPLER	TLP521-2GR,8PIN,2PORT,GR,DIP
.2	T11-18	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP
.2	AR1-3	SEAY0000301	ARRESTOR	T83-A350X,350 V,RAD
.2	PT1-8,PT11-18	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD
.2	PT101-106	SETY0000601	THERMISTOR	TRF600-160-0.130,PTC,RAD
.2	CN2	ENHY0001507	CONNECTOR,HEADER	JE117-A25G-06,6 PIN,2.54 mm,STRAIGHT
.2	CN3	ENHY0001606	CONNECTOR,HEADER	JE118-A8G-20,20PIN,2.54mm,STRAIGHT
.2	CN4	ENHY0005301	CONNECTOR,HEADER	JE118-D8T-26,26 PIN,2.54 mm,STRAIGHT,TIN,2ROW,2BODY
.2	CN5	ENHY0005302	CONNECTOR,HEADER	JE118-D8T-30,30 PIN,2.54 mm,STRAIGHT,TIN,2ROW,2BODY
.2	MJ1	ENJM0000101	CONN,JACK/PLUG,MODULAR	AR-623G3-S2-GY30,2 PIN,3 JACK,PCB MOUNT,UL/AU50
.2	MJ2	ENJM9012301	CONN,JACK/PLUG,MODULAR	AR-623G8-S4-BK30,4 PIN,8 JACK,RJ11
1		SAGY9250501	SLU8 PCB ASSY,OPTION	IPLDK-60 SLU8 STG,OPTION,1.3
.2	L3	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M,R/TP,ROHS
.2	ZD61	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD,43 V,1500 W,R/TP,TVS,DIODE
..3	U2-3	EUSY0016901	IC	PEB2466-H,QFP,64PIN.BK,SICOFI-4
..3	U5	EUSY0036802	IC,TR ARRAY	KID65003AF,SOIC,16PIN.R/TP
..3	U110,U112,U114,U116	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,R/TP,PB-FREE
..3	U111,U113,U115,U117	EUSY0037302	IC,OP AMP	NJM4556M,SOIC,8PIN.R/TP
..3	U118	EUSY0078101	IC,,DC-TO-DC CONVERTER CONTROL CIRCUITS	MC34063AD,SO-8,8 PIN,R/TP
..3	L1-2	STCY0001301	CHOKE COIL	STCY0001301,0.1 mH,RAD
..3	Q21-28	EQBP0001402	TR,BJT,PNP	MMBTA63,SOT-23,0.35W,R/TP
..3	Q31-38	EQBN0003001	TR,BJT,NPN	MMBTA13,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q40,Q57-64	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	Q41-56	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	ZD41-48,ZD51-58	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	ZD62-69	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D21-28	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D40	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	D42	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB),400 V,1.5 A,R/TP,FAST SWITCHING
..3	BD11-18	EDBY0000601	DIODE,BRIDGE	EDBY0000601(THAILAND),SMD,600V,0.5A,R/TP
..3	RL11-18	EKMY0002801	RELAY,DC	G6K-2F-Y-TR DC4.5V,4.5 V,A,V,A,ohm,2
..3	C14,C732	ECTH0000146	CAP,TANTAL,CHIP	100uF 16V
..3	C201-208,C211-218	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C221-228,C429,C431	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C241-248	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C251-258	ECCH0000358	CAP,CERAMIC,CHIP	15nF 50V
..3	C261-268,C467	ECES0000120	CAP,AL ELEC,SMD	4.7uF 50V
..3	C271,C273,C275,C277	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V

Level	Location No	Part No	Description	Specification
..3	C281-288,R201-208	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C291-298	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C301-308	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C311,C313,C315,C317	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C321-328	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C331,C333,C335,C337	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C341-348	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C403,C424,C430,C432	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C421-422,C450-451	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C423,C452	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	C433,C462	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C436,C453,C459	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C437,C458,C460,C466	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C461,C465,C468	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C434,C463	ECCH0000274	CAP,CERAMIC,CHIP	0.22uF 16V
..3	C500-501	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C723-731,C734-735	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C733	ECCH0000339	CAP,CERAMIC,CHIP	470pF 50V
..3	C736	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	R211-218,R600,R611	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R221-228	ERHY0001902	RES,CHIP	1K 1/2W
..3	R231-238,R514	ERHY0001707	RES,CHIP	510 1/2W
..3	R241-248,R331-338	ERHY0014601	RES,CHIP	300 1/2W
..3	R251-258,R311-318	ERHY0000672	RES,CHIP	30K 1/10W
..3	R261-268,R301-308	ERHY0000663	RES,CHIP	15K 1/10W
..3	R271-278	ERHY0000952	RES,CHIP	1K 1/10W
..3	R281-288	ERHY0000697	RES,CHIP	300K 1/10W
..3	R291-298	ERHY0000968	RES,CHIP	5.1K 1/10W
..3	R351-358,R391-398	ERHY0000466	RES,CHIP	10K 1/16W
..3	R361-368	ERHY0000626	RES,CHIP	620 1/10W
..3	R371-378	ERHY0000479	RES,CHIP	47K 1/16W
..3	R381-388,R612,R614	ERHY0000901	RES,CHIP	0 1/10W
..3	R401-408	ERHY0000474	RES,CHIP	30K 1/16W
..3	R501	ERHY0000367	RES,CHIP	100K 1/16W
..3	R503	ERHY0000342	RES,CHIP	12K 1/16W
..3	R506,R508	ERHY0000426	RES,CHIP	120 1/16W
..3	R507,R509	ERHY0000405	RES,CHIP	10 1/16W
..3	R511	ERHY0000967	RES,CHIP	4.7K 1/10W
..3	R512	ERHY0000963	RES,CHIP	3.3K 1/10W
..3	R513	ERHY0001402	RES,CHIP	0 1/4W
..3	R515-522	ERHY0000917	RES,CHIP	30 1/10W
..3	R523-530	ERHY0000988	RES,CHIP	39K 1/10W
..3	R531-533	ERHY0000903	RES,CHIP	1 1/10W
..3	R534	ERHY0000632	RES,CHIP	1.2K 1/10W

Level	Location No	Part No	Description	Specification
..3	R535	ERHY0000673	RES,CHIP	33K 1/10W
..3	R536	ERHY0000621	RES,CHIP	330 1/10W
..3	R537-544	ERHY0000985	RES,CHIP	30K 1/10W
..3	R601	ERHY0000401	RES,CHIP	0 1/16W
..3	R602-609	ERHY0000975	RES,CHIP	10K 1/10W
..3	R613,R615,R617,R619	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R616,R618,R620	ERHY0000901	RES,CHIP	0 1/10W
..3	R621,R623,R625	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R622,R624,R626	ERHY0000901	RES,CHIP	0 1/10W
.2	T11-18	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP
.2	PT1-8,PT11-18	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD
.2	CN2	ENSY9017401	CONN,SOCKET	JE610-A254-G30P,30 PIN,STRAIGHT,2.54 mm
.2	CN3	ENSY9017301	CONN,SOCKET	JE610-A2.54-G26,26 PIN,STRAIGHT,2.54 mm
1		ABAZ0007306	BAG ASSY	IPLDK-60 CSB316 STG ZZ,ipLDK-60 Bag Ass'y(CSB316)
.2		GMFY0001801	SCREW MACHINE,PAN	GMFY0001801,3 MM,6 MM,SB41(FZY),B,+,KB1023 M3 X 6 SZ P
.2		GTFB0001801	SCREW TAP TITE,PAN B	GTFB0001801,3 MM,8 MM,SB41(FZY),B,+,TB M3 X 8 SZ P
.2		MMCY9001101	MOUNTING SCREW	IPLDK-60 CHB308 STG SV,ipLDK-60 Mounting Screw(M3x28.3)
.2		MSAZ9033601	SHEET	AR-CSB316 STG WB,ARIA SOHO 316SLB Sheet
.2		MBAD0002402	BAG,VINYL(PE)	ZZ,GT-9760 X DX A
1		ENJM9012901	CONN,JACK/PLUG,MODULAR	DEK404-2C,4 PIN,2 JACK
1		MLAC9006306	LABEL,BARCODE	IPLDK-60 BKSU BRA WA
1		MLAZ9045001	LABEL	IPLDK-60 BKSU BRA WA,NORTEL MASTER BOX SPEC. LABEL
1		ABEZ9072501	BOX ASSY	IPLDK-60 CSB316 BRA ZZ
.2		MBAA9001803	BAG,AIR CAP	AR-SLIB8 STG ZZ
.2		MBAD9008303	BAG,VINYL(PE)	AR-MBU STG ZZ,0.06t X 270 X 350
.2		MBEF9105701	BOX,UNIT	AR-SLIB8 STG ZZ
.2		MBEE0001502	BOX,MASTER	AR-CHB308 STG ZZ

5.5 SLIB8

Level	Location No	Part No	Description	Specification
1		SAGY9251401	SLIB8 PCB ASSY,OPTION	IPLDK-60 SLIB8 STG,OPTION,1.1,
.2	L3	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M ,R/TP ,ROHS
.2	ZD61	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD,43V,1500W,TVS,DIODE
.2	CN1	ENHY0001707	CONNECTOR,HEADER	HIF3H-50DA-2.54DSA,50PIN,2.54mm,STRAIGHT
.2	MJ2	ENJM9012301	CONN,JACK/PLUG,MODULAR	623PCB4-G8,4 PIN,8 JACK,RJ11

Level	Location No	Part No	Description	Specification
.2		SAGA9056201	PCB ASSY,OPTION,AUTO	IPLDK-60 SLIB8 STG,OPTION,1.1
..3	U1,U8,U13,U21-22	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	U2-3	EUSY0016901	IC,SICOFI-4	PEB2466-H,QFP,64PIN.BK
..3	U4-5	EUSY0036802	IC,TR ARRAY	KID65003AF,SOIC,16PIN
..3	U6	EUSY0050801	IC,LOW VTG 3-TO-8 LINE DECODER	TC74LCX138FT,TSSOP,16 PIN
..3	U7,U10	EUSY0062001	IC,OCTAL D-TYPE FLIP-FLOP 3-STATE OUTPUT	TC74ACT574FT,TSSOP,20 PIN
..3	U9,U11	EUSY0085301	IC,LOW VOLTAGE CMOS OCTAL BUFFER	MC74LCX541DTR2G,TSSOP,20 PIN,3-STATE
..3	U14	EUSY0049401	IC,LOW-VTG QUAD 2-INPUT OR GATE	TC74LCX32FT,TSSOP,14 PIN
..3	U101,U103-105,U151	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	U110,U112,U114,U116	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,PB-FREE
..3	U111,U113,U115,U117	EUSY0037302	IC,OP AMP	NJM4556M,SOIC,8PIN
..3	U152	EUSY0078101	IC,DC-TO-DC CONVERTER CONTROL CIRCUITS	MC34063AD,SO-8,8 PIN
..3	U153	EUSY0049701	IC,OCTAL BUS BUFFER/NON INVERTING	TC74ACT541FT,TSSOP,20 PIN
..3	L1-2	STCY0001301	CHOKE COIL	STCY0001301,0.1 mH,RAD,ED3337
..3	Q21-28	EQBP0001402	TR,BJT,PNP	KST63-MTF,SOT-23,0.35W,R/TP
..3	Q31-38	EQBN0003001	TR,BJT,NPN	KST13-MTF,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q39-54	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	Q101-108	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	ZD11-16,ZD21-26	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	ZD41-48,ZD51-58	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9V,.35W,PB-FREE
..3	ZD101-108	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D11-13,Q11-16	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	D21-28	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D30	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB),400V,1.5A,FAST SWITCHING
..3	BD1-3	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	BD11-18	EDBY0000601	DIODE,BRIDGE	B6S,SMD,600V,0.5A,R/TP
..3	LD1	EDLH9012301	DIODE,LED,CHIP	HT-170NB,Blue,ETC,R/TP
..3	RL4-7	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	RL11-18	EKMY0002801	RELAY,DC	AGQ200A4HZ,5 V,A,V,A,ohm,2
..3	C1-2,C4-7	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C3,C9,C11-12	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C14,C724-725	ECTH0000146	CAP,TANTAL,CHIP	100uF 16V
..3	C111-113,C121-123	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C131-133,C141-143	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C151-153,C161-164	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C167-169,C171-176	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C197,C271,C273,C275	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C201-208,C211-218	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C221-228,C429,C431	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C241-248,C434,C463	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C251-258	ECCH0000358	CAP,CERAMIC,CHIP	15nF 50V
..3	C261-268,C467	ECES0000120	CAP,AL ELEC,SMD	4.7uF 50V
..3	C277,C311,C313,C315	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V

Level	Location No	Part No	Description	Specification
..3	C281-288,C404-407	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C291-298	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C301-308	ECCH0000327	CAP,CERAMIC,CHIP	100pF 50V
..3	C317,C468,C738	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C321-328	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C331,C333,C335,C337	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C341-348	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C403,C424,C430,C432	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C412-417,C419-420	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C421-422,C450-451	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C423,C452	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	C433,C462	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C436,C453,C459	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C437,C458,C460,C466	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C461,C465	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C501-506,C511-516	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C521-523,C525,C531	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C590-591,C600	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C601-602	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C722,C726	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C723,C727-736	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C737	ECCH0000339	CAP,CERAMIC,CHIP	470pF 50V
..3	C739	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C740-743	ECCH0000318	CAP,CERAMIC,CHIP	33pF 50V
..3	C744-749	ECCH0000222	CAP,CERAMIC,CHIP	33pF 50V
..3	C750-757	ECCH0000247	CAP,CERAMIC,CHIP	1nF 50V
..3	R1-13	ERHY0000420	RES,CHIP	68 1/16W
..3	R14-22,R63-67	ERHY0000412	RES,CHIP	33 1/16W
..3	R23	ERHY0000901	RES,CHIP	0 1/10W
..3	R24,R48-54,R56-62	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R68	ERHY0000441	RES,CHIP	680 1/16W
..3	R69-71,R724-731	ERHY0000412	RES,CHIP	33 1/16W
..3	R101-106,R111,R113	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R115,R121-126,R131	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R133,R135,R141-146	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R151,R153,R155	ERHY0000958	RES,CHIP	2K 1/10W
..3	R152,R154,R156	ERHY0000985	RES,CHIP	30K 1/10W
..3	R161-166,R171-176	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R181-186,R201-208	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R211-218,R504-505	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R221-228,R231-238	ERHY0001707	RES,CHIP	510 1/2W
..3	R241-248,R331-338	ERHY0014601	RES,CHIP	300 1/2W
..3	R251-258,R311-318	ERHY0000672	RES,CHIP	30K 1/10W
..3	R261-268,R301-308	ERHY0000663	RES,CHIP	15K 1/10W

Level	Location No	Part No	Description	Specification
..3	R271-278	ERHY0000952	RES,CHIP	1K 1/10W
..3	R281-288	ERHY0000697	RES,CHIP	300K 1/10W
..3	R291-298	ERHY0000968	RES,CHIP	5.1K 1/10W
..3	R341-348,R351-358	ERHY0000466	RES,CHIP	10K 1/16W
..3	R361-368	ERHY0000626	RES,CHIP	620 1/10W
..3	R371-378	ERHY0000479	RES,CHIP	47K 1/16W
..3	R381-388,R668-669	ERHY0000901	RES,CHIP	0 1/10W
..3	R391-398	ERHY0000975	RES,CHIP	10K 1/10W
..3	R401-408	ERHY0000474	RES,CHIP	30K 1/16W
..3	R501	ERHY0000367	RES,CHIP	100K 1/16W
..3	R503	ERHY0000342	RES,CHIP	12K 1/16W
..3	R506,R508	ERHY0000934	RES,CHIP	180 1/10W
..3	R507,R509	ERHY0000405	RES,CHIP	10 1/16W
..3	R601-606,R611,R613	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R615,R622,R624,R626	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R631,R633,R635	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R651-652,R663-666	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R653,R667	ERHY0000466	RES,CHIP	10K 1/16W
..3	R654,R720-723	ERHY0001402	RES,CHIP	0 1/4W
..3	R655-662	ERHY0000917	RES,CHIP	30 1/10W
..3	R670-677	ERHY0000988	RES,CHIP	39K 1/10W
..3	R678	ERHY0000621	RES,CHIP	330 1/10W
..3	R679-681	ERHY0000903	RES,CHIP	1 1/10W
..3	R682	ERHY0000632	RES,CHIP	1.2K 1/10W
..3	R683	ERHY0000673	RES,CHIP	33K 1/10W
..3	R701-708	ERHY0000985	RES,CHIP	30K 1/10W
..3	R710	ERHY0001707	RES,CHIP	510 1/2W
..3	R751,R753,R755,R757	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R752,R754,R756,R758	ERHY0000401	RES,CHIP	0 1/16W
..3	R759,R761,R763,R765	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R760,R762,R764,R766	ERHY0000401	RES,CHIP	0 1/16W
.2	U100,U102	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	T1-3	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	T11-18	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP
.2	PT1-8,PT11-18	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD
.2	PT101-106	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	AR1-3	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	C101-103	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	CN2-5	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	MJ1	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
1		ABAZ0007308	BAG ASSY	IPLDK-60 SLIB8 STG ZZ,ipLDK-60 Bag Ass'y(SLIB8)
.2		GMFY0001801	SCREW MACHINE,PAN	GMFY0001801,3MM,6MM,SB41(FZY),B,+,KB1023 M3 X 6 SZ

Level	Location No	Part No	Description	Specification
.2		GTFB0001801	SCREW TAP TITE,PAN B	GTFB0001801,3MM,8MM,SB41(FZY),B,+,TB M3 X 8 SZ P
.2		MBAD0002408	BAG,VINYL(PE)	ZZ,UNDERAY X DX A
.2		MMCY9001101	MOUNTING SCREW	IPLDK-60 CHB308 STG SV,Mounting Screw(M3x28.3)
.2		MSAZ9033602	SHEET	AR-SLIB8 STG WB,ARIA SOHO 8SLB Sheet
1		ABEZ9066302	BOX ASSY	IPLDK-60 SLU8 STG ZZ,
.2		MBAA9001803	BAG,AIR CAP	AR-SLIB8 STG ZZ,
.2		MBAD9008303	BAG,VINYL(PE)	AR-MBU STG ZZ,0.06t X 270 X 350
.2		MBEE0001502	BOX,MASTER	LDK-1248 308HYB STG ZZ,
.2		MBEF9105701	BOX,UNIT	AR-SLIB8 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,LVP2890 BOX BARCODE LABEL
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,

5.6 E1HB8

Level	Location No	Part No	Description	Specification
1		SAGY9250801	E1HB8 PCB ASSY,OPTION	IPLDK-60 E1HB8 STG,OPTION,1.0,
.2	X3	EXST0000501	TCXO,32.768MHz	VCXO-FQD 32.768MHZ,30PPM,15pF,RAD,20.7*13.06*5.1
.2	SW1	ESDY0000103	SWITCH,DIP	KSD42H,24V,0.3A,4POLE,RAD
.2	SW2	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	CN1	ENHY0001604	CONNECTOR,HEADER	JE118-A8G-14,14PIN,2.54mm,STRAIGHT
.2	CN2	ENNY0001503	CONNECTOR,HOUSING TO BOARD	GIL-G-4P-S3T2-E5,4PIN,2.5mm,STRAIGHT
.2	CN3	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	CN5	ENHY0001707	CONNECTOR,HEADER	HIF3H-50DA-2.54DSA,50PIN,2.54mm,STRAIGHT
.2	CN6	ENHY0005301	CONNECTOR,HEADER	JE118-D8T-26,26 PIN,2.54mm,STRAIGHT,TIN,2ROW,2BODY
.2	CN7	ENHY0005302	CONNECTOR,HEADER	JE118-D8T-30,30 PIN,2.54mm,STRAIGHT,TIN,2ROW,2BODY
.2	MJ1	ENJM0002101	CONN,JACK/PLUG,MODULAR	2-406549-4,8PIN,1JACK,1*1 RJ-45 ASSY WITH LED
.2	MJ2	ENJM9012301	CONN,JACK/PLUG,MODULAR	623PCB4-G8,4 PIN,8 JACK,RJ11
.2	MJ3	ENJM0001104	CONN,JACK/PLUG,MODULAR	ED8427-A0008-S322,8PIN,1JACK,PCB MOUNT
.2		SAGA9056001	PCB ASSY,OPTION,AUTO	IPLDK-60 E1HB8 STG,OPTION,1.0,
..3	U1,U18-19	EUSY0049401	IC,LOW-VTG QUAD 2-INPUT OR GATE	TC74LCX32FT,TSSOP,14 PIN
..3	U2	EUSY0049201	IC,UNDERVOLTAGE SENSING	MC34064D-5R2G,SO-8,8 PIN
..3	U3	EUSY0033802	IC,BINARY COUNTER	MM74HC4060MX_NL,SOIC,16 PIN,PB-FREE
..3	U4	EUSY0130003	IC,DC-DC CONVERTER	NCP1117ST18T3G,SOT-223,3 PIN,PB-FREE
..3	U5,U17,U20	EUSY0049301	IC,LOW-VTG QUAD 2-INPUT AND GATE	TC74LCX08FT,TSSOP,14 PIN
..3	U6	EUSY0050001	IC,LOW VTG HEX INVERTER	TC74LCX04FT,TSSOP,14 PIN
..3	U7	EUSY0049101	IC,3A LDO REGULATOR	FAN1587AM33X,TO-263,3 PIN,PB-FREE
..3	U8	EUSY0270801	IC,3.3V Single Power Phy	KSZ8721SL,SSOP,48 PIN,Pb Free
..3	U9,U15	EUSY0032602	IC,DUAL FILP-FLOP	74HC74D/G,SOIC,16PIN

Level	Location No	Part No	Description	Specification
..3	U10	EUSY0035202	IC,LOGIC	MC74HC4051ADR2G,SOIC,16 PIN,PB-FREE
..3	U11	EUSY0005001	IC,LOGIC	CD74HC4046AM,SOIC,16PIN
..3	U12	EUSY0099401	IC,MICROCONTROLLER	S3C4530A1-QE80,QFP,208 PIN
..3	U13	EUSY0049701	IC,OCTAL BUS BUFFER/NON INVERTING	TC74ACT541FT,TSSOP,20 PIN
..3	U14,U21	EUSY0050701	IC,LOW EMI SPECTRUM SPREAD CLOCK	CYIFS781BSXC,SOIC,8 PIN
..3	U16	EUSY0035002	IC,12-STAGE BINARY RIPPLE COUNTER	74HC4040D,SOIC,16PIN
..3	U22	EUSY0049501	IC,3-TO-8 LINE DECODER	MC74ACT138DTR2,TSSOP,16 PIN,PB-FREE
..3	U23	EUSY0120401	IC,SYNCHRONOUS DRAM	MT48LC4M32B2P-7,TSOP,86 PIN,BK
..3	U24	EUSY0282601	IC	PEF2256HV2.2,, PIN,R/TP
..3	U25-26	EUSY0074001	IC,OCTAL BUS TRANSCEIVER	TC74VHC245FT,TSSOP,20 PIN
..3	U27-29,U31,U36	EUSY0085301	IC,LOW VOLTAGE CMOS OCTAL BUFFER	MC74LCX541DTR2G,TSSOP,20 PIN,3-STATE
..3	U30	EUSY0023601	IC,CMOS 2-INPUT OR GATE	TC74ACT32FN,SOP,14PIN
..3	U32,U37	EUSY0062001	IC,OCTAL D-TYPE FLIP-FLOP 3-STATE OUTPUT	TC74ACT574FT,TSSOP,20 PIN
..3	U33	EUSY0120501	IC,BOOT SECTOR FLASH MEMORY	S29AL032D90TFI030,TSOP,48 PIN,BK
..3	U34	EUCA9002801	IC,ASIC	ACT-2,0.2,MQFP,240 PIN,ETC
..3	U35	EUSY0052001	IC,FIXED-POINT DSP	TMS320VC5402PGE100,TQFP,144 PIN
..3	X1	EXXY0005801	X-TAL,25 MHz	25MHZ HC-49/SM,50 PPM,20pF,50ohm,SMD,11.4*4.67*3.4
..3	X2,X5	EXSY0001401	OSCILLATOR,10 MHz	KMS-873C 10MHZ,50 PPM,15 pF,SMD,7.0*5.0*1.7
..3	X4	EXSY0019101	OSCILLATOR,8.192 MHz	BMS-873R_8.192MHZ,30PPM,pF,SMD,7.0*5.0*1.7,3.3V OPER
..3	T1	STMY0006101	TRANSFORMER,MATCHING	SJ1102,16 PIN,SMD ,IP-KTS
..3	T3	STMY0019001	TRANSFORMER,MATCHING	T1144NL,16 PIN,SMD,DUAL T1/CEPT/ISDN-PRI TRANSFORMER
..3	L1-2	SFEY0002801	FILTER,EMI/POWER	ZCYS51R5-2PAT-01,SMD,0.5A,COMMON-MODE CHOKE COIL
..3	L3	SFBY0000101	FILTER,BEAD	SFBY0000101,4.06*3.05*2.54,3A
..3	ZD1	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9 V,.35 W,R/TP,PB-FREE
..3	D1,D24	EDSY0002101	DIODE,SWITCHING	FM140,SMD,40V,1A,R/TP
..3	D2,D4-23	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D3	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	LD1-8	EDLH0001301	DIODE,LED,CHIP	PG1102W-TR,GREEN,ETC,R/TP,3015
..3	LD9	EDLH0000901	DIODE,LED,CHIP	HT-150 HR-CT,RED,3216,R/TP,
..3	LD10	EDLH9012301	DIODE,LED,CHIP	HT-170NB,Blue,ETC,R/TP
..3	SW3	ESCY0000901	SWITCH,TACT	EVQ QG3 03W,15V,20mA,HORIZONTAL,G,LIGHT TOUCH
..3	PT1-8	SETY0000701	THERMISTOR	PSR21083B-2,PTC,RAD,ED9705-T
..3	FB1-2,FB4,FB7	SFBH0002001	FILTER,BEAD,CHIP	HB-1M1608-102JT,1000 ohm,1608
..3	FB3	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	FB5-6	SFBH0000301	FILTER,BEAD,CHIP	HH-1M2012-121,120ohm,2012,R/TP
..3	FB8	SFBH0000401	FILTER,BEAD,CHIP	HH-1M2012-102JT,1000ohm,2012,R/TP
..3	FB9-12	SFBH0007401	FILTER,BEAD,CHIP	HB-1M1608- 121JT,120 ohm,1608
..3	C1,C7,C11,C17,C46	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C2,C71,C92,C96	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V

Level	Location No	Part No	Description	Specification
..3	C3,C53,C137,C167	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C4,C138	ECTH0000144	CAP,TANTAL,CHIP	100uF 10V
..3	C5,C13,C15,C19-20	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C6,C12,C16	ECTH0000124	CAP,TANTAL,CHIP	10uF 16V
..3	C8,C49	ECZH0006001	CAP,CHIP,MAKER	1nF 2KV
..3	C9,C27,C29-30,C56	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C10,C63	ECCH0000356	CAP,CERAMIC,CHIP	10nF 50V
..3	C14,C18,C21-22,C26	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C23	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	C24-25,C33,C36	ECCH0000313	CAP,CERAMIC,CHIP	20pF 50V
..3	C28,C34-35,C37	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C31,C51-52,C103-109	ECCH0000218	CAP,CERAMIC,CHIP	22pF 50V
..3	C32,C38-43,C48,C50	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C44-45,C148	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C47	ECCH0000246	CAP,CERAMIC,CHIP	820pF 50V
..3	C54,C59,C62,C64,C66	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C55,C60-61,C67-68	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C57	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V
..3	C58	ECCH0000332	CAP,CERAMIC,CHIP	220pF 50V
..3	C65,C145,C220	ECCH0000250	CAP,CERAMIC,CHIP	1.8nF 50V
..3	C69,C72-81,C84,C86	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C70,C83,C98	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C82,C85,C87,C97	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C88,C101-102	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C89,C118	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C90,C93-95,C99-100	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C91	ECCH0000381	CAP,CERAMIC,CHIP	0.01uF 50V
..3	C110-112,C114,C119	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C113,C116-117	ECCH0000218	CAP,CERAMIC,CHIP	22pF 50V
..3	C115	ECCH0000279	CAP,CERAMIC,CHIP	0.47uF 10V
..3	C120-121,C123,C125	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C122,C124,C126-130	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C131-132,C164,C170	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C133,C165,C178-179	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C134-136,C139-142	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C143,C219	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C144,C146-147,C149	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C150,C180	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C151-153,C157-158	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C154-155,C159-161	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C156,C168	ECCH0000218	CAP,CERAMIC,CHIP	22pF 50V
..3	C162-163,C169	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C166,C172-174,C181	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C171	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V

Level	Location No	Part No	Description	Specification
..3	C175-177	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C182-189	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C190-197,C206-213	ECCH0000345	CAP,CERAMIC,CHIP	1.5nF 50V
..3	C198-205	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C214,C221	ECCH0000222	CAP,CERAMIC,CHIP	33pF 50V
..3	R1-3,R6,R8-9	ERHY0000441	RES,CHIP	680 1/16W
..3	R4,R7	ERHY0000425	RES,CHIP	100 1/16W
..3	R5,R10	ERHY0000948	RES,CHIP	680 1/10W
..3	R11	ERHY0000505	RES,CHIP	1M 1/16W
..3	R12,R36,R55,R92,R94	ERHY0000401	RES,CHIP	0 1/16W
..3	R13,R19,R87	ERHY0000943	RES,CHIP	470 1/10W
..3	R14,R16-17	ERHY0000487	RES,CHIP	100K 1/16W
..3	R15,R35,R68	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R18	ERHY0000483	RES,CHIP	68K 1/16W
..3	R20	ERHY0000991	RES,CHIP	51K 1/10W
..3	R21	ERHY0000490	RES,CHIP	180K 1/16W
..3	R22,R24,R27-30,R32	ERHY0000466	RES,CHIP	10K 1/16W
..3	R25-26	ERHY0000445	RES,CHIP	1K 1/16W
..3	R31,R40,R42-44,R48	ERHY0000613	RES,CHIP	75 1/10W
..3	R33	ERHY0000437	RES,CHIP	470 1/16W
..3	R34,R41	ERHY0000343	RES,CHIP	13K 1/16W
..3	R38-39,R50-51	ERHY0004101	RES,CHIP	49.9 1/10W
..3	R45-46	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	R47	ERHY0000931	RES,CHIP	120 1/10W
..3	R49	ERHY0000940	RES,CHIP	330 1/10W
..3	R52,R61,R75,R545	ERHY0000918	RES,CHIP	33 1/10W
..3	R53-54,R56,R63,R66	ERHY0000466	RES,CHIP	10K 1/16W
..3	R57	ERHY0000926	RES,CHIP	75 1/10W
..3	R58,R62	ERHY0000659	RES,CHIP	10K 1/10W
..3	R59	ERHY0000644	RES,CHIP	3.6K 1/10W
..3	R60,R144-161	ERHY0000434	RES,CHIP	330 1/16W
..3	R65	ERHY0000963	RES,CHIP	3.3K 1/10W
..3	R64,R67,R71,R91	ERHY0000423	RES,CHIP	82 1/16W
..3	R69,R72-73,R76,R80	ERHY0000466	RES,CHIP	10K 1/16W
..3	R70,R77,R89	ERHY0000410	RES,CHIP	22 1/16W
..3	R74,R82,R365	ERHY0000910	RES,CHIP	10 1/10W
..3	R78-79,R90,R218-228	ERHY0000420	RES,CHIP	68 1/16W
..3	R83,R550	ERHY0004102	RES,CHIP	330 1/10W
..3	R85,R127-142	SFBH0001301	FILTER,BEAD,CHIP	LI0603A221R,220 ohm,1608
..3	R86	ERHY0004104	RES,CHIP	120 1/10W
..3	R88,R195,R313,R344	ERHY0000412	RES,CHIP	33 1/16W
..3	R93	ERHY0000642	RES,CHIP	3.3K 1/10W
..3	R95-98	ERHY0000912	RES,CHIP	15 1/10W
..3	R99	ERHY0000615	RES,CHIP	120 1/10W

Level	Location No	Part No	Description	Specification
..3	R100-101	ERHY0000441	RES,CHIP	680 1/16W
..3	R102,R104-105,R143	ERHY0000466	RES,CHIP	10K 1/16W
..3	R103,R162-164,R169	ERHY0000410	RES,CHIP	22 1/16W
..3	R106-121,R229-236	ERHY0000450	RES,CHIP	2.2K 1/16W
..3	R124-125,R408-410	ERHY0000401	RES,CHIP	0 1/16W
..3	R126,R368,R411,R454	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R165-168,R170-186	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	R187-188,R375,R378	ERHY0000410	RES,CHIP	22 1/16W
..3	R189-194,R196-209	ERHY0000466	RES,CHIP	10K 1/16W
..3	R210-217,R248-255	SFBH0001301	FILTER,BEAD,CHIP	LI0603A221R,220 ohm,1608
..3	R237-247,R275-291	ERHY0000466	RES,CHIP	10K 1/16W
..3	R256-266,R305-312	ERHY0000420	RES,CHIP	68 1/16W
..3	R267-274,R482,R491	ERHY0000450	RES,CHIP	2.2K 1/16W
..3	R292-297,R413,R483	ERHY0000434	RES,CHIP	330 1/16W
..3	R298-304,R329-335	ERHY0000423	RES,CHIP	82 1/16W
..3	R314-319,R328	ERHY0000466	RES,CHIP	10K 1/16W
..3	R320-327,R352-359	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R336-343,R422-428	ERHY0000420	RES,CHIP	68 1/16W
..3	R345-351,R360,R366	ERHY0000466	RES,CHIP	10K 1/16W
..3	R361,R560	SFBH0001301	FILTER,BEAD,CHIP	LI0603A221R,220 ohm,1608
..3	R370,R381-383,R481	ERHY0000412	RES,CHIP	33 1/16W
..3	R371,R390	ERHY0000430	RES,CHIP	220 1/16W
..3	R373,R464,R485	ERHY0000423	RES,CHIP	82 1/16W
..3	R374,R394,R400-407	ERHY0000466	RES,CHIP	10K 1/16W
..3	R388-389,R392	ERHY0000410	RES,CHIP	22 1/16W
..3	R396-399,R421	ERHY0000410	RES,CHIP	22 1/16W
..3	R412,R416,R418,R420	ERHY0000466	RES,CHIP	10K 1/16W
..3	R414,R435,R445	ERHY0000401	RES,CHIP	0 1/16W
..3	R417	ERHY0000616	RES,CHIP	150 1/10W
..3	R429	ERHY0000617	RES,CHIP	180 1/10W
..3	R430-431,R434,R437	ERHY0000410	RES,CHIP	22 1/16W
..3	R433,R462,R468,R470	ERHY0000466	RES,CHIP	10K 1/16W
..3	R436,R438-441,R443	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R442,R444,R449,R461	ERHY0000410	RES,CHIP	22 1/16W
..3	R446,R456-457,R460	ERHY0000420	RES,CHIP	68 1/16W
..3	R447,R453,R478-480	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R455,R459,R471	ERHY0000401	RES,CHIP	0 1/16W
..3	R458,R465,R474,R484	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R466,R472,R475	ERHY0000420	RES,CHIP	68 1/16W
..3	R467,R469,R473	ERHY0000410	RES,CHIP	22 1/16W
..3	R476,R536-544	ERHY0000466	RES,CHIP	10K 1/16W
..3	R477	ERHY0000901	RES,CHIP	0 1/10W
..3	R486-490	ERHY0000420	RES,CHIP	68 1/16W
..3	R492-499,R554	99999999999	NOT ASSEMBLE	NOT ASSEMBLE

Level	Location No	Part No	Description	Specification
..3	R535	ERHY0000975	RES,CHIP	10K 1/10W
..3	R546-548,R557	ERHY0000423	RES,CHIP	82 1/16W
..3	R549	ERHY0000443	RES,CHIP	820 1/16W
..3	R551	ERHY0000431	RES,CHIP	240 1/16W
..3	R555-556	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R558-559	ERHY0000405	RES,CHIP	10 1/16W
.2	T2	SFEY0001501	FILTER,EMI/POWER	TC-80321,RAD,ED3889
.2	T4-11	STMY0004001	TRANSFORMER,MATCHING	STMY0004001,6 PIN,DIP,ED3729
1		SAGY9250501	SLU8 PCB ASSY,OPTION	IPLDK-60 SLU8 STG,OPTION,1.1,
.2	L3	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M,R/TP,ROHS
.2	ZD61	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD,43V,1500 W,TVS,DIODE
.2	CN2	ENHY0001705	CONNECTOR,HEADER	HIF3H-30DA-2.54DSA,30PIN,2.54mm,STRAIGHT
.2	CN3	ENHY0001704	CONNECTOR,HEADER	HIF3H-26DA-2.54DSA,26PIN,2.54mm,STRAIGHT
.2		SAGA9055701	PCB ASSY,OPTION,AUTO	IPLDK-60 SLU8 STG,OPTION,1.1,
..3	U2-3	EUSY0016901	IC,SICOFI-4	PEB2466-H,QFP,64PIN.BK
..3	U5	EUSY0036802	IC,TR ARRAY	KID65003AF,SOIC,16PIN
..3	U110,U112,U114,U116	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,PB-FREE
..3	U111,U113,U115,U117	EUSY0037302	IC,OP AMP	NJM4556M,SOIC,8PIN
..3	U118	EUSY0078101	IC,DC-TO-DC CONVERTER CONTROL	MC34063AD,SO-8,8 PIN
..3	L1-2	STCY0001301	CHOKE COIL	STCY0001301,0.1mH,RAD,ED3337
..3	Q21-28	EQBP0001402	TR,BJT,PNP	KST63-MTF,SOT-23,0.35W,R/TP
..3	Q31-38	EQBN0003001	TR,BJT,NPN	KST13-MTF,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q40,Q57-64	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	Q41-56	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	ZD41-48,ZD51-58	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23,3.9V,.35W,PB-FREE
..3	ZD62-69	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D21-28	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D40	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	D42	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB),400V,1.5A,FAST SWITCHING
..3	BD11-18	EDBY0000601	DIODE,BRIDGE	B6S,SMD,600V,0.5A,R/TP,ED4016
..3	RL11-18	EKMY0002801	RELAY,DC	AGQ200A4HZ,5 V, A, V, A, ohm,2
..3	C14,C732	ECTH0000146	CAP,TANTAL,CHIP	100uF 16V
..3	C201-208,C211-218	ECCH0000343	CAP,CERAMIC,CHIP	1nF 50V
..3	C221-228,C429,C431	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C241-248	ECCH0000371	CAP,CERAMIC,CHIP	0.22uF 50V
..3	C251-258	ECCH0000358	CAP,CERAMIC,CHIP	15nF 50V
..3	C261-268,C467	ECES0000120	CAP,AL ELEC,SMD	4.7uF 50V
..3	C271,C273,C275,C277	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C281-288,R201-208	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C291-298	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C301-308	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C311,C313,C315,C317	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C321-328	ECTH0000108	CAP,TANTAL,CHIP	1uF 16V

Level	Location No	Part No	Description	Specification
..3	C331,C333,C335,C337	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C341-348	ECTH0000121	CAP,TANTAL,CHIP	10uF 10V
..3	C403,C424,C430,C432	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C421-422,C450-451	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C423,C452	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	C433,C462	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C434,C463	ECCH0000274	CAP,CERAMIC,CHIP	0.22uF 16V
..3	C436,C453,C459	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C437,C458,C460,C466	ECTH0000113	CAP,TANTAL,CHIP	2.2uF 16V
..3	C461,C465,C468	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C500-501	ECCH0000225	CAP,CERAMIC,CHIP	47pF 50V
..3	C723-731,C734-735	ECET0000535	CAP,AL ELEC	220uF 50V
..3	C733	ECCH0000339	CAP,CERAMIC,CHIP	470pF 50V
..3	C736	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	R211-218,R600,R611	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R221-228,R231-238	ERHY0001707	RES,CHIP	510 1/2W
..3	R241-248,R331-338	ERHY0014601	RES,CHIP	300 1/2W
..3	R251-258,R311-318	ERHY0000672	RES,CHIP	30K 1/10W
..3	R261-268,R301-308	ERHY0000663	RES,CHIP	15K 1/10W
..3	R271-278	ERHY0000952	RES,CHIP	1K 1/10W
..3	R281-288	ERHY0000697	RES,CHIP	300K 1/10W
..3	R291-298	ERHY0000968	RES,CHIP	5.1K 1/10W
..3	R351-358,R391-398	ERHY0000466	RES,CHIP	10K 1/16W
..3	R361-368	ERHY0000626	RES,CHIP	620 1/10W
..3	R371-378	ERHY0000479	RES,CHIP	47K 1/16W
..3	R381-388,R612,R614	ERHY0000901	RES,CHIP	0 1/10W
..3	R401-408	ERHY0000474	RES,CHIP	30K 1/16W
..3	R501	ERHY0000367	RES,CHIP	100K 1/16W
..3	R503	ERHY0000342	RES,CHIP	12K 1/16W
..3	R506,R508	ERHY0000426	RES,CHIP	120 1/16W
..3	R507,R509	ERHY0000405	RES,CHIP	10 1/16W
..3	R511	ERHY0000967	RES,CHIP	4.7K 1/10W
..3	R512	ERHY0000963	RES,CHIP	3.3K 1/10W
..3	R513	ERHY0001402	RES,CHIP	0 1/4W
..3	R514	ERHY0001707	RES,CHIP	510 1/2W
..3	R515-522	ERHY0000917	RES,CHIP	30 1/10W
..3	R523-530	ERHY0000988	RES,CHIP	39K 1/10W
..3	R531-533	ERHY0000903	RES,CHIP	1 1/10W
..3	R534	ERHY0000632	RES,CHIP	1.2K 1/10W
..3	R535	ERHY0000673	RES,CHIP	33K 1/10W
..3	R536	ERHY0000621	RES,CHIP	330 1/10W
..3	R537-544	ERHY0000985	RES,CHIP	30K 1/10W
..3	R601	ERHY0000401	RES,CHIP	0 1/16W
..3	R602-609	ERHY0000975	RES,CHIP	10K 1/10W

Level	Location No	Part No	Description	Specification
..3	R613,R615,R617,R619	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R616,R618,R620	ERHY0000901	RES,CHIP	0 1/10W
..3	R621,R623,R625	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R622,R624,R626	ERHY0000901	RES,CHIP	0 1/10W
.2	T11-18	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP,ED3714
.2	PT1-8,PT11-18	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC,ohm,RAD
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,
1		ABEZ9066302	BOX ASSY	IPLDK-60 SLU8 STG ZZ,
.2		MBAA9001803	BAG,AIR CAP	AR-SLIB8 STG ZZ,
.2		MBAD9008303	BAG,VINYL(PE)	AR-MBU STG ZZ,0.06t X 270 X 350
.2		MBEE0001502	BOX,MASTER	LDK-1248 308HYB STG ZZ,
.2		MBEF9105701	BOX,UNIT	AR-SLIB8 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,FOR NORTEL LVP2890 BOX BARCODE
1		ABAZ0007305	BAG ASSY	IPLDK-60 E1HB8 STG ZZ,ipLDK-60 Bag Ass'y(E1HB8)
.2		GMFY0001801	SCREW MACHINE,PAN	GMFY0001801,3MM,6MM,SB41(FZY),B,+,KB1023 M3X6 SZ P
.2		MBAD0002408	BAG,VINYL(PE)	ZZ,UNDERAY X DX A
.2		MMCY9001101	MOUNTING SCREW	IPLDK-60 CHB308 STG SV,Mounting Screw(M3x28.3)
.2		MSAZ9033604	SHEET	IPLDK-60 E1HB8 STG WB,ipLDK-60 PC Sheet(E1HB8)
.2		GTFB0001801	SCREW TAP TITE,PAN B	GTFB0001801,3 MM,8 MM,SB41(FZY),B,+,TB M3 X 8 SZ P

5.7 PRHB8

Level	Location No	Part No	Description	Specification
1		ABAZ0007305	BAG ASSY	IPLDK-60 E1HB8 STG ZZ,ipLDK-60 Bag Ass'y(E1HB8)
2		GMFY0001801	SCREW MACHINE,PAN	GMFY0001801,3 MM,6 MM,SB41(FZY),B,+,KB1023 M3 X 6 SZ P
2		MMCY9001101	MOUNTING SCREW	IPLDK-60 CHB308 STG SV,ipLDK-60 Mounting Screw(M3x28.3)
2		MSAZ9033604	SHEET	IPLDK-60 E1HB8 STG WB,ipLDK-60 PC Sheet(E1HB8)
2		GTFB0001801	SCREW TAP TITE,PAN B	GTFB0001801(THAILAND),3 MM,8 MM,SB41(FZY),B,+,TB M3 X 8 SZ P
2		MBAD0002402	BAG,VINYL(PE)	ZZ,GT-9760 X DX A
1		ABEZ9066301	BOX ASSY	AR-SLU8 STG ZZ,
2		MBAA9001803	BAG,AIR CAP	AR-SLIB8 STG ZZ,
2		MBEE0001502	BOX,MASTER	AR-CHB308 STG ZZ,
2		MBEF9105701	BOX,UNIT	AR-SLIB8 STG ZZ,
2		MLAJ0000601	LABEL,MASTER BOX	ZZ,PCB BOX X ST A
2		MBAD9008303	BAG,VINYL(PE)	AR-MBU STG ZZ,0.06t X 270 X 350
1		MLAC0000301	LABEL,BARCODE	GHX-308A X ST A
1		SAGY9250501	PCB ASSY,OPTION	IPLDK-60 SLU8 STG,OPTION,1.3,
.2	ZD61	EDTY0007201	DIODE,TVS	1.5KE43A,DO-201AD ,43 V,1500 W,R/TP ,TVS,DIODE

Level	Location No	Part No	Description	Specification
.2	L3	ELFR9001501	INDUCTOR,RADIAL	C/C 90UH,90 uH,M ,R/TP ,ROHS
..3	C421-422,C450-451,C500-501	ECCH0000225	CAP,CERAMIC,CHIP	47 pF,50V,J,NP0,TC,1608,R/TP
..3	C301-308	ECCH0000231	CAP,CERAMIC,CHIP	100 pF,50V,J,NP0,TC,1608,R/TP
..3	C311,C313,C315,C317,C331	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C333,C335,C337,C403,C424	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C430,C432,C436,C453	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C459,C461,C465,C468	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C434,C463	ECCH0000274	CAP,CERAMIC,CHIP	0.22 uF,16V,Z,Y5V,HD,1608,R/TP
..3	C733	ECCH0000339	CAP,CERAMIC,CHIP	470 pF,50V,J,NP0,TC,2012,R/TP
..3	C201-208,C211-218	ECCH0000343	CAP,CERAMIC,CHIP	1 nF,50V,J,NP0,TC,2012,R/TP
..3	C251-258	ECCH0000358	CAP,CERAMIC,CHIP	15 nF,50V,K,X7R,HD,2012,R/TP
..3	C736	ECCH0000368	CAP,CERAMIC,CHIP	0.1 uF,50V,K,X7R,HD,2012,R/TP
..3	C271,C273,C275,C277	ECCH0000369	CAP,CERAMIC,CHIP	0.1 uF,50V,Z,Y5V,HD,2012,R/TP
..3	C241-248	ECCH0000371	CAP,CERAMIC,CHIP	0.22 uF,50V,Z,Y5V,HD,2012,R/TP
..3	C423,C452	ECCH0001815	CAP,CERAMIC,CHIP	1 nF,50V ,K ,X7R ,HD ,1608 ,R/TP
..3	C261-268,C467	ECES0000120	CAP,AL ELEC,SMD	4.7 uF,50V ,M ,MV ,STD ,5*5.2 ,R/TP
..3	C321-328	ECTH0000108	CAP,TANTAL,CHIP	1 uF,16V,K,STD,3216,TP
..3	C221-228,C429,C431	ECTH0000113	CAP,TANTAL,CHIP	2.2 uF,16V,M,STD,3216,TP
..3	C437,C458,C460,C466	ECTH0000113	CAP,TANTAL,CHIP	2.2 uF,16V,M,STD,3216,TP
..3	C291-298	ECTH0000117	CAP,TANTAL,CHIP	4.7 uF,10V ,M ,STD ,3216 ,TP
..3	C341-348	ECTH0000121	CAP,TANTAL,CHIP	10 uF,10V,K,STD,3216,TP
..3	C433,C462	ECTH0000126	CAP,TANTAL,CHIP	10 uF,6.3V,M,STD,3216,TP
..3	C14,C732	ECTH0000146	CAP,TANTAL,CHIP	100 uF,16V,M,STD,7343,TP
..3	BD11-18	EDBY0000601	DIODE,BRIDGE	EDBY0000601(THAILAND),SMD,600V,0.5A,R/TP,ED4016
..3	ZD41-48,ZD51-58	EDNY0001802	DIODE,ZENER	BZX84C3V9LT1G,SOT-23 ,3.9 V,.35 W,R/TP ,PB-FREE
..3	ZD62-69	EDNY0001804	DIODE,ZENER	BZX84C6V8LT1G,SOT-23,6.8V,0.35W,R/TP
..3	D40	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	D21-28	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	D42	EDSY0004501	DIODE,SWITCHING	RS2G,DO-214AA(SMB) ,400 V,1.5 A,R/TP ,FAST SWITCHING
..3	RL11-18	EKMY0002801	RELAY,DC	G6K-2F-Y-TR DC4.5V,4.5 V, A, V, A, ohm,2 ,
..3	Q31-38	EQBN0003001	TR,BJT,NPN	KST13-MTF,SOT-23,0.35W,R/TP,DARLINGTON
..3	Q40,Q57-64	EQBN0003501	TR,BJT,NPN	BC846BL T1G,SOT-23,0.3W,TP
..3	Q21-28	EQBP0001402	TR,BJT,PNP	KST63-MTF,SOT-23,0.35W,R/TP
..3	Q41-56	EQBP0001801	TR,BJT,PNP	BC856BL T1G,SOT-23,0.3W,R/TP
..3	R503	ERHY0000342	RES,CHIP	12K ohm,1/16W,F,1608,R/TP
..3	R501	ERHY0000367	RES,CHIP	100K ohm,1/16W,F,1608,R/TP
..3	R601	ERHY0000401	RES,CHIP	0 ohm,1/16W,J,1608,R/TP
..3	R351-358,R391-398	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R401-408	ERHY0000474	RES,CHIP	30K ohm,1/16W,J,1608,R/TP
..3	R371-378	ERHY0000479	RES,CHIP	47K ohm,1/16W,J,1608,R/TP
..3	R536	ERHY0000621	RES,CHIP	330 ohm,1/10W,F,2012,R/TP
..3	R361-368	ERHY0000626	RES,CHIP	620 ohm,1/10W,F,2012,R/TP
..3	R534	ERHY0000632	RES,CHIP	1.2K ohm,1/10W,F,2012,R/TP

Level	Location No	Part No	Description	Specification
..3	R261-268,R301-308	ERHY0000663	RES,CHIP	15K ohm,1/10W,F,2012,R/TP
..3	R251-258,R311-318	ERHY0000672	RES,CHIP	30K ohm,1/10W,F,2012,R/TP
..3	R535	ERHY0000673	RES,CHIP	33K ohm,1/10W,F,2012,R/TP
..3	R281-288	ERHY0000697	RES,CHIP	300K ohm,1/10W,F,2012,R/TP
..3	R531-533	ERHY0000903	RES,CHIP	1 ohm,1/10W,J,2012,R/TP
..3	R515-522	ERHY0000917	RES,CHIP	30 ohm,1/10W,J,2012,R/TP
..3	R271-278	ERHY0000952	RES,CHIP	1K ohm,1/10W,J,2012,R/TP
..3	R512	ERHY0000963	RES,CHIP	3.3K ohm,1/10W,J,2012,R/TP
..3	R511	ERHY0000967	RES,CHIP	4.7K ohm,1/10W,J,2012,R/TP
..3	R291-298	ERHY0000968	RES,CHIP	5.1K ohm,1/10W,J,2012,R/TP
..3	R602-609	ERHY0000975	RES,CHIP	10K ohm,1/10W,J,2012,R/TP
..3	R537-544	ERHY0000985	RES,CHIP	30K ohm,1/10W,J,2012,R/TP
..3	R523-530	ERHY0000988	RES,CHIP	39K ohm,1/10W,J,2012,R/TP
..3	R513	ERHY0001402	RES,CHIP	0 ohm,1/4W,J,3216,R/TP
..3	R241-248,R331-338	ERHY0014601	RES,CHIP	300 ohm,1/2W ,F ,3225 ,R/TP
..3	U2-3	EUSY0016901	IC	PEB2466-H,QFP,64PIN.BK,SICOFI-4
..3	U110,U112,U114,U116	EUSY0036702	IC	LM2903MX,SOIC ,8 PIN,R/TP ,COMPARATOR,PB-FREE
..3	U5	EUSY0036802	IC	KID65003AF,SOIC,16PIN.R/TP,TR ARRAY(ED7740-S)
..3	U111,U113,U115,U117	EUSY0037302	IC	NJM4556M,SOIC,8PIN.R/TP,OP AMP
..3	U118	EUSY0078101	IC	MC34063AD,SO-8 ,8 PIN,R/TP ,DC-TO-DC CONVERTER CONTROL CIRCUITS
..3	L1-2	STCY0001301	CHOKE COIL	STCY0001301,0.1 mH,RAD,ED3337
..3	R507,R509	ERHY0000405	RES,CHIP	10 ohm,1/16W,J,1608,R/TP
..3	C281-288	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	R201-208,R211-218,R600	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	R611,R613,R615,R617	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	R619,R621,R623,R625	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	C723-731,C734-735	ECET0000535	CAP,AL ELEC	220 uF,50V,M,SMS,STD,10*12.5,5mm,TP
..3	R506,R508	ERHY0000426	RES,CHIP	120 ohm,1/16W,J,1608,R/TP
..3	R381-388,R612,R614,R616	ERHY0000901	RES,CHIP	0 ohm,1/10W,J,2012,R/TP
..3	R618,R620,R622,R624,R626	ERHY0000901	RES,CHIP	0 ohm,1/10W,J,2012,R/TP
..3	R221-228	ERHY0001902	RES,CHIP	1 Kohm,1/2W ,J ,5025 ,R/TP
..3	R231-238,R514	ERHY0001707	RES,CHIP	510 ohm,1/2W ,J ,5025 ,R/TP
.2	PT1-8,PT11-18	SETY0000501	THERMISTOR	TR250-120T-R1-B-0.5-0.125,PTC , ohm,RAD ,6322NB00102
.2	T11-18	STMY0003801	TRANSFORMER,MATCHING	STMY0003801,5 PIN,DIP,ED3714
.2	CN3	ENSY9017301	CONN,SOCKET	JE610-A2.54-G26,26 PIN,STRAIGHT , ,2.54 mm,
.2	CN2	ENSY9017401	CONN,SOCKET	JE610-A254-G30P,30 PIN,STRAIGHT , ,2.54 mm,
1		SAGY9250801	PCB ASSY,OPTION	IPLDK-60 E1HB8 STG,OPTION,1.3,
.2	CN3,SW2	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
.2	CN1	ENHY0001604	CONNECTOR,HEADER	JE118-A8G-14,14PIN,2.54mm,STRAIGHT,ED8873-S 14
.2	CN6	ENHY0005301	CONNECTOR,HEADER	JE118-D8T-26,26 PIN,2.54 mm,STRAIGHT ,TIN ,2ROW,2BODY
.2	CN7	ENHY0005302	CONNECTOR,HEADER	JE118-D8T-30,30 PIN,2.54 mm,STRAIGHT ,TIN ,2ROW,2BODY
.2	MJ3	ENJM0001104	CONN,JACK/PLUG,MODULAR	AR-657PS-8-BK30,8PIN,1JACK,PCB MOUNT,ED8427-A0008-S322
.2	MJ2	ENJM9012301	CONN,JACK/PLUG,MODULAR	AR-623G8-S4-BK30,4 PIN,8 JACK,RJ11 ,

Level	Location No	Part No	Description	Specification
.2	CN2	ENNY0001503	CONNECTOR,HOUSING TO BOARD	GIL-G-4P-S3T2-E5,4PIN,2.5mm,STRAIGHT,ED8782-P0004
.2	SW1	ESDY0000103	SWITCH,DIP	KSD42H,24V,0.3A,4POLE,RAD,ED9009-X0004-S
.2	X3	EXST0000501	TCXO	VCXO-FQD 32.768MHZ,32.768MHz,30PPM,15pF,RAD,20.7*13.06*5.1,
..3	C214,C221	ECCH0000222	CAP,CERAMIC,CHIP	33 pF,50V,J,NP0,TC,1608,R/TP
..3	C47	ECCH0000246	CAP,CERAMIC,CHIP	820 pF,50V,J,SL,TC,1608,R/TP
..3	C115	ECCH0000279	CAP,CERAMIC,CHIP	0.47 uF,10V ,Z ,Y5V ,HD ,1608 ,R/TP
..3	C24-25,C33,C36	ECCH0000313	CAP,CERAMIC,CHIP	20 pF,50V,J,NP0,TC,2012,R/TP
..3	C198-205	ECCH0000343	CAP,CERAMIC,CHIP	1 nF,50V,J,NP0,TC,2012,R/TP
..3	C190-197,C206-213	ECCH0000345	CAP,CERAMIC,CHIP	1.5 nF,50V,K,X7R,HD,2012,R/TP
..3	C91	ECCH0000381	CAP,CERAMIC,CHIP	0.01 uF,50V ,J ,NP0 ,TC ,2012 ,R/TP
..3	C23	ECCH0001815	CAP,CERAMIC,CHIP	1 nF,50V ,K ,X7R ,HD ,1608 ,R/TP
..3	C182-189	ECET0000535	CAP,AL ELEC	220 uF,50V,M,SMS,STD,10*12.5,5mm,TP
..3	C57	ECTH0000108	CAP,TANTAL,CHIP	1 uF,16V,K,STD,3216,TP
..3	C150,C180	ECTH0000117	CAP,TANTAL,CHIP	4.7 uF,10V ,M ,STD ,3216 ,TP
..3	C6,C12,C16	ECTH0000124	CAP,TANTAL,CHIP	10 uF,16V,M,STD,3528,TP
..3	C2,C71,C92,C96	ECTH0000125	CAP,TANTAL,CHIP	10 uF,6.3V,K,STD,3216,TP
..3	C133,C165,C178-179	ECTH0000125	CAP,TANTAL,CHIP	10 uF,6.3V,K,STD,3216,TP
..3	C4,C138	ECTH0000144	CAP,TANTAL,CHIP	100 uF,10V,M,STD,7343,TP
..3	LD9	EDLH0000901	DIODE,LED,CHIP	HT-150 HR-CT,RED,3216,R/TP,
..3	LD1-8	EDLH0001301	DIODE,LED,CHIP	PG1102W-TR,GREEN,ETC,R/TP,3015
..3	LD10	EDLH9012301	DIODE,LED,CHIP	HT-170NB,Blue ,ETC ,R/TP ,
..3	D1,D24	EDSY0002101	DIODE,SWITCHING	FM140,SMD,40V,1A,R/TP
..3	R34,R41	ERHY0000343	RES,CHIP	13K ohm,1/16W,F,1608,R/TP
..3	R4,R7	ERHY0000425	RES,CHIP	100 ohm,1/16W,J,1608,R/TP
..3	R371,R390	ERHY0000430	RES,CHIP	220 ohm,1/16W,J,1608,R/TP
..3	R1-3,R6,R8-9,R100-101	ERHY0000441	RES,CHIP	680 ohm,1/16W,J,1608,R/TP
..3	R25-26	ERHY0000445	RES,CHIP	1K ohm,1/16W,J,1608,R/TP
..3	R18	ERHY0000483	RES,CHIP	68K ohm,1/16W,J,1608,R/TP
..3	R14,R16-17	ERHY0000487	RES,CHIP	100K ohm,1/16W,J,1608,R/TP
..3	R21	ERHY0000490	RES,CHIP	180K ohm,1/16W,J,1608,R/TP
..3	R11	ERHY0000505	RES,CHIP	1M ohm,1/16W,J,1608,R/TP
..3	R99	ERHY0000615	RES,CHIP	120 ohm,1/10W,F,2012,R/TP
..3	R417	ERHY0000616	RES,CHIP	150 ohm,1/10W,F,2012,R/TP
..3	R429	ERHY0000617	RES,CHIP	180 ohm,1/10W,F,2012,R/TP
..3	R93	ERHY0000642	RES,CHIP	3.3K ohm,1/10W,F,2012,R/TP
..3	R59	ERHY0000644	RES,CHIP	3.6K ohm,1/10W,F,2012,R/TP
..3	R477	ERHY0000901	RES,CHIP	0 ohm,1/10W,J,2012,R/TP
..3	R95-98	ERHY0000912	RES,CHIP	15 ohm,1/10W,J,2012,R/TP
..3	R57	ERHY0000926	RES,CHIP	75 ohm,1/10W,J,2012,R/TP
..3	R47	ERHY0000931	RES,CHIP	120 ohm,1/10W,J,2012,R/TP
..3	R13,R19,R87	ERHY0000943	RES,CHIP	470 ohm,1/10W,J,2012,R/TP
..3	R5,R10	ERHY0000948	RES,CHIP	680 ohm,1/10W,J,2012,R/TP

Level	Location No	Part No	Description	Specification
..3	R65	ERHY0000963	RES,CHIP	3.3K ohm,1/10W,J,2012,R/TP
..3	R20	ERHY0000991	RES,CHIP	51K ohm,1/10W,J,2012,R/TP
..3	R38-39,R50-51	ERHY0004101	RES,CHIP	49.9 ohm,1/10W ,F ,1608 ,R/TP
..3	SW3	ESCY0000901	SWITCH,TACT	EVQQXP03W,15 V,20 mA,HORIZONTAL , G,LIGHT TOUCH
..3	U34	EUCA9002801	IC,ASIC	ACT-2,0.2 ,MQFP ,240 PIN,ETC ,
..3	U11	EUSY0005001	IC	74HC4046AD,SOIC,16PIN.R/TP,LOGIC
..3	U30	EUSY0023601	IC	TC74ACT32FN,SOP,14PIN.R/TP,CMOS 2-INPUT OR GATE
..3	U9,U15	EUSY0032602	IC	74HC74D/G,SOIC ,14 PIN,R/TP ,DUAL FILP-FLOP
..3	U3	EUSY0033802	IC	MM74HC4060MX_NL,SOIC ,16 PIN,R/TP ,BINARY COUNTER,PB-FREE
..3	U16	EUSY0035002	IC	74HC4040D,SOIC,16PIN.R/TP,12-STAGE BINARY RIPPLE COUNTER
..3	U7	EUSY0049101	IC	FAN1587AM33X,TO-263 ,3 PIN,R/TP ,3A LDO REGULATOR,PB-FREE
..3	U2	EUSY0049201	IC	MC34064D-5R2G,SO-8 ,8 PIN,R/TP ,UNDERVOLTAGE SENSING
..3	U5,U17,U20	EUSY0049301	IC	TC74LCX08FT,TSSOP ,14 PIN,R/TP ,LOW-VTG QUAD 2-INPUT AND GATE
..3	U1,U18-19	EUSY0049401	IC	TC74LCX32FT,TSSOP ,14 PIN,R/TP ,LOW-VTG QUAD 2-INPUT OR GATE
..3	U22	EUSY0049501	IC	MC74ACT138DTR2,TSSOP ,16 PIN,R/TP ,3-TO-8 LINE DECODER,PB-FREE
..3	U6	EUSY0050001	IC	TC74LCX04FT,TSSOP ,14 PIN,R/TP ,LOW VTG HEX INVERTER
..3	U14,U21	EUSY0050701	IC	CYIFS781BSXC,SOIC ,8 PIN,R/TP ,LOW EMI SPECTRUM SPREAD CLOCK
..3	U35	EUSY0052001	IC	TMS320VC5402PGE100,TQFP ,144 PIN,BK ,FIXED-POINT DSP
..3	U32,U37	EUSY0062001	IC	TC74ACT574FT,TSSOP ,20 PIN,R/TP ,OCTAL D-TYPE FLIP-FLOP 3-STATE OUTPUT
..3	U25-26	EUSY0074001	IC	TC74VHC245FT,TSSOP ,20 PIN,R/TP ,OCTAL BUS TRANSCEIVER
..3	U27-29,U31,U36	EUSY0085301	IC	MC74LCX541DTR2G,TSSOP ,20 PIN,R/TP ,LOW VOLTAGE CMOS OCTAL BUFFER,3-STATE
..3	U12	EUSY0099401	IC	S3C4530A1-QE80,QFP ,208 PIN,BK ,MICROCONTROLLER
..3	U23	EUSY0120401	IC	MT48LC4M32B2P-7,TSOP ,86 PIN,BK ,SYNCHRONOUS DRAM
..3	U33	EUSY0120501	IC	S29AL032D90TFI030,TSOP ,48 PIN,BK ,BOOT SECTOR FLASH MEMORY
..3	U4	EUSY0130003	IC	NCP1117ST18T3G,SOT-223 ,3 PIN,R/TP ,DC-DC CONVERTER,PB-FREE
..3	U8	EUSY0270801	IC	KSZ8721SL,SSOP ,48 PIN,R/TP ,3.3V Single Power Phy, Pb Free
..3	U24	EUSY0282601	IC	PEF2256HV2.2,, PIN,R/TP ,
..3	X2,X5	EXSY0001401	OSCILLATOR	KMS-873C 10MHZ,10 MHz,50 PPM,15 pF,SMD ,7.0*5.0*1.7 ,
..3	X4	EXSY0019101	OSCILLATOR	BMS-873R_8.192MHZ,8.192 MHz,30 PPM, pF,SMD ,7.0*5.0*1.7 ,3.3V OPER.,BMS-870R
..3	X1	EXXY0005801	X-TAL	25MHZ HC-49/SM,25 MHz,50 PPM,20 pF,50 ohm,SMD ,11.4*4.67*3.4 ,
..3	PT1-8	SETY0000701	THERMISTOR	PSR21083B-2,PTC,RAD,ED9705-T
..3	FB5-6	SFBH0000301	FILTER,BEAD,CHIP	HH-1M2012-121,120ohm,2012,R/TP
..3	L3	SFBY0000101	FILTER,BEAD	SFBY0000101,4.06*3.05*2.54,3A,ED3863-S/SMT

Level	Location No	Part No	Description	Specification
..3	T3	STMY0019001	TRANSFORMER,MATCHING	T1144NL,16 PIN,SMD,DUAL T1/CEPT/ISDN-PRI TRANSFORMER
..3	C291	ECCH0000277	CAP,CERAMIC,CHIP	470 pF,50V ,J ,NP0 ,TC ,1608 ,R/TP
..3	C290	ECTH0000116	CAP,TANTAL,CHIP	4.7 uF,10V,K,STD,3216,TP
..3	R86,R551	ERHY0000426	RES,CHIP	120 ohm,1/16W,J,1608,R/TP
..3	R785	ERHY0000641	RES,CHIP	3K ohm,1/10W,F,2012,R/TP
..3	R784	ERHY0000663	RES,CHIP	15K ohm,1/10W,F,2012,R/TP
..3	U39	EUSY0008901	IC	MIC5205-3.0YM5,SOT-23-5,5 PIN,R/TP,REGULATOR,PBFREE
..3	U10	EUSY0077401	IC	DG2001DV-T1-E3,SOT23-6,6 PIN,R/TP,SPDT ANALOG SWITCH,Pb Free
..3	U38	EUSY0111801	IC	MC74VHC125DT,TSSOP,14PIN,QUAD BUS BUFFER WITH 3-STATE CONTROL INPUTS
..3	C31,C51-52	ECCH0000218	CAP,CERAMIC,CHIP	22 pF,50V,J,NP0,TC,1608,R/TP
..3	C107,C113,C156,C168,C220	ECCH0000218	CAP,CERAMIC,CHIP	22 pF,50V,J,NP0,TC,1608,R/TP
..3	C65,C145	ECCH0000250	CAP,CERAMIC,CHIP	1.8 nF,50V,K,X7R,HD,1608,R/TP
..3	C90,C93-95,C99-100	ECCH0000271	CAP,CERAMIC,CHIP	0.1 uF,16V,K,X7R,HD,1608,R/TP
..3	C120-121,C123,C125	ECCH0000271	CAP,CERAMIC,CHIP	0.1 uF,16V,K,X7R,HD,1608,R/TP
..3	C131-132,C170	ECCH0000271	CAP,CERAMIC,CHIP	0.1 uF,16V,K,X7R,HD,1608,R/TP
..3	C63	ECCH0000356	CAP,CERAMIC,CHIP	10 nF,50V ,K ,X7R ,HD ,2012 ,R/TP
..3	C14,C18,C21-22,C26	ECCH0000368	CAP,CERAMIC,CHIP	0.1 uF,50V,K,X7R,HD,2012,R/TP
..3	C28,C34-35,C37,C44-45	ECCH0000368	CAP,CERAMIC,CHIP	0.1 uF,50V,K,X7R,HD,2012,R/TP
..3	C7,C17,C46,C61,C67	ECCH0000369	CAP,CERAMIC,CHIP	0.1 uF,50V,Z,Y5V,HD,2012,R/TP
..3	C9,C27,C29-30	ECTH0000126	CAP,TANTAL,CHIP	10 uF,6.3V,M,STD,3216,TP
..3	C56,C82,C85,C87	ECTH0000126	CAP,TANTAL,CHIP	10 uF,6.3V,M,STD,3216,TP
..3	R70,R77,R89	ERHY0000410	RES,CHIP	22 ohm,1/16W,J,1608,R/TP
..3	R103,R162-164,R169	ERHY0000410	RES,CHIP	22 ohm,1/16W,J,1608,R/TP
..3	R187-188,R375,R378	ERHY0000410	RES,CHIP	22 ohm,1/16W,J,1608,R/TP
..3	R388-389,R392	ERHY0000410	RES,CHIP	22 ohm,1/16W,J,1608,R/TP
..3	R396-399,R473	ERHY0000410	RES,CHIP	22 ohm,1/16W,J,1608,R/TP
..3	R61,R88,R91	ERHY0000412	RES,CHIP	33 ohm,1/16W,J,1608,R/TP
..3	R195,R313,R344,R370	ERHY0000412	RES,CHIP	33 ohm,1/16W,J,1608,R/TP
..3	R381-383,R449,R467,R469	ERHY0000412	RES,CHIP	33 ohm,1/16W,J,1608,R/TP
..3	R481,R573-574,R623-742	ERHY0000412	RES,CHIP	33 ohm,1/16W,J,1608,R/TP
..3	R78-79,R90	ERHY0000420	RES,CHIP	68 ohm,1/16W,J,1608,R/TP
..3	R422-428,R446,R456-457	ERHY0000420	RES,CHIP	68 ohm,1/16W,J,1608,R/TP
..3	R460,R466,R472,R475	ERHY0000420	RES,CHIP	68 ohm,1/16W,J,1608,R/TP
..3	R486-490,R572,R743-783	ERHY0000420	RES,CHIP	68 ohm,1/16W,J,1608,R/TP
..3	R292-293,R549	ERHY0000443	RES,CHIP	820 ohm,1/16W,J,1608,R/TP
..3	R482,R491	ERHY0000450	RES,CHIP	2.2K ohm,1/16W,J,1608,R/TP
..3	R439-440,R447,R453	ERHY0000458	RES,CHIP	4.7K ohm,1/16W,J,1608,R/TP
..3	R478-480,R555-556	ERHY0000458	RES,CHIP	4.7K ohm,1/16W,J,1608,R/TP
..3	R545	ERHY0000918	RES,CHIP	33 ohm,1/10W,J,2012,R/TP
..3	R83	ERHY0004102	RES,CHIP	330 ohm,1/10W ,F ,1608 ,R/TP
..3	FB3,FB13	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608 ,
..3	R45-46,R165-166,R168	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608 ,

Level	Location No	Part No	Description	Specification
..3	R170-172,R175,R178-186	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608 ,
..3	FB8,FB14-16,FB70-71	SFBH0001301	FILTER,BEAD,CHIP	LI0603G221R,220 ohm,1608 ,
..3	R85,R361,R560,R786	SFBH0001301	FILTER,BEAD,CHIP	LI0603G221R,220 ohm,1608 ,
..3	D25-26	EDTY0008001	DIODE,TVS	USBLC6-4SC6,SOT-23 6L,5 V,300 W,R/TP,LOW CAPACITANCE TVS DIODE ARRAY
..3	R33	ERHY0000428	RES,CHIP	180 ohm,1/16W,J,1608,R/TP
..3	C58,C89,C118	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	R12,R15,R35,R68	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	R125-126,R368,R409,R414	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	R465,R492-499,R554	99999999999	NOT ASSEMBLE	,NOT ASSEMBLE
..3	C3,C10,C13,C32,C38-43	ECCH0000259	CAP,CERAMIC,CHIP	10 nF,50V,K,X7R,HD,1608,R/TP
..3	C48,C53-54,C59,C62,C64	ECCH0000259	CAP,CERAMIC,CHIP	10 nF,50V,K,X7R,HD,1608,R/TP
..3	C69,C72-74,C77-81	ECCH0000259	CAP,CERAMIC,CHIP	10 nF,50V,K,X7R,HD,1608,R/TP
..3	C148,C151-153,C157-158	ECCH0000259	CAP,CERAMIC,CHIP	10 nF,50V,K,X7R,HD,1608,R/TP
..3	C162-164,C167,C169	ECCH0000259	CAP,CERAMIC,CHIP	10 nF,50V,K,X7R,HD,1608,R/TP
..3	C175-177,C262-282,C286	ECCH0000259	CAP,CERAMIC,CHIP	10 nF,50V,K,X7R,HD,1608,R/TP
..3	C1,C5,C11,C15,C19-20	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C50,C55,C60,C68,C70	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C75-76,C83-84,C86,C88	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C98,C101-102,C110-112	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C114,C119,C122,C124	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C134-136,C139-144	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C146-147,C149,C154-155	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C159-161,C166,C172-174	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C181,C219,C222-261	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	C288-289	ECCH0000272	CAP,CERAMIC,CHIP	0.1 uF,25V,Z,Y5V,HD,1608,R/TP
..3	D2,D8-23	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	R36,R55,R92,R94	ERHY0000401	RES,CHIP	0 ohm,1/16W,J,1608,R/TP
..3	R408,R410,R435,R445	ERHY0000401	RES,CHIP	0 ohm,1/16W,J,1608,R/TP
..3	R455,R459,R471	ERHY0000401	RES,CHIP	0 ohm,1/16W,J,1608,R/TP
..3	R373,R464,R485	ERHY0000423	RES,CHIP	82 ohm,1/16W,J,1608,R/TP
..3	R546-548,R557,R565	ERHY0000423	RES,CHIP	82 ohm,1/16W,J,1608,R/TP
..3	R148-149,R152,R158-159	ERHY0000434	RES,CHIP	330 ohm,1/16W,J,1608,R/TP
..3	R161,R294-297,R413	ERHY0000434	RES,CHIP	330 ohm,1/16W,J,1608,R/TP
..3	R483,R566-571	ERHY0000434	RES,CHIP	330 ohm,1/16W,J,1608,R/TP
..3	R22,R24,R27-30,R32	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R53-54,R56,R63,R66,R69	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R72-73,R76,R80,R102	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R104-105,R143,R189-190	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R192-194,R198,R201-209	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R286-291,R366,R374,R394	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R403-404,R412,R418,R420	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R433,R462,R470,R535	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	R544,R562-564	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP

Level	Location No	Part No	Description	Specification
..3	R575-622,R787-789	ERHY0000466	RES,CHIP	10K ohm,1/16W,J,1608,R/TP
..3	FB1-2,FB4,FB7	SFBH0002001	FILTER,BEAD,CHIP	HB-1M1608-102JT,1000 ohm,1608 ,
..3	FB18-69,FB72	SFBH0002001	FILTER,BEAD,CHIP	HB-1M1608-102JT,1000 ohm,1608 ,
..3	R52,R74-75,R82	SFBH0002001	FILTER,BEAD,CHIP	HB-1M1608-102JT,1000 ohm,1608 ,
..3	R365,R558-559	SFBH0002001	FILTER,BEAD,CHIP	HB-1M1608-102JT,1000 ohm,1608 ,
..3	FB9-11	SFBH0007401	FILTER,BEAD,CHIP	HB-1M1608- 121JT,120 ohm,1608 ,
.2	T2	SFEY0001501	FILTER,EMI/POWER	TC-80321,RAD,ED3889
.2	T4-11	STMY0004001	TRANSFORMER,MATCHING	STMY0004001,6 PIN,DIP,ED3729
.2	PT9-10	SETY0000601	THERMISTOR	TRF600-160-0.130,PTC,RAD,ED9703-X0160-T
.2	CN5	ENSY9017201	CONN,SOCKET	JE610-A254-G50V,50 PIN,STRAIGHT,2.54 mm,
.2	MJ1	ENJM0008803	CONN,JACK/PLUG,MODULAR	0810-1X1T-36-F,10PIN,1JACK,ANGLE,10/100BASE-TX EXTENDED TEMP BELMAG WITH LEDS
.2	SW4	ESDY0000101	SWITCH,DIP	BSM-101A,24V,0.3A,1POLE,RAD,ED9009-X0001-S
1	WSBB09	WSBB9206001	SOFTWARE,FIRMWARE,SYSTEM	0x45D2,GS88F-2.0Ag, IPLDK-60 PRHB8 RUS

5.8 VOIB

Level	Location No	Part No	Description	Specification
1		SAGY9250701	VOIB PCB ASSY,OPTION	IPLDK-60 VOIB STG,OPTION,1.2
.2	CN1	ENHY0001606	CONNECTOR,HEADER	JE118-A8G-20,20PIN,2.54mm,STRAIGHT
.2	CN2	ENNY0001503	CONNECTOR,HOUSING TO BOARD	GIL-G-4P-S3T2-E5,4PIN,2.5mm,STRAIGHT
.2	CN3-4	ENBY0002301	CONNECTOR,BOARD TO BOARD	5-5179180-1,40 PIN,0.8 mm,BOTTOM
.2	CN5	ENHY0001701	CONNECTOR,HEADER	HIF3H-16DA-2.54DSA,16PIN,2.54mm,STRAIGHT
.2	CN7	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2	MJ1	ENJM0008803	CONN,JACK/PLUG,MODULAR	0810-1X1T-36-F,10PIN,1JACK,ANGLE,10/100BASE-TX
.2	SW2	ESDY0000103	SWITCH,DIP	KSD42H,24V,0.3A,4POLE,RAD
.2		SAGA9055901	PCB ASSY,OPTION,AUTO	IPLDK-60 VOIB STG,OPTION,1.2,
..3	U1	EUSY9297001	IC	S3C2510A,PBGA,416 PIN,ST
..3	U2	EUSY0120401	IC,SYNCHRONOUS DRAM	MT48LC4M32B2P-7,TSOP,86 PIN,BK
..3	U3	EUSY0120501	IC,BOOT SECTOR FLASH MEMORY	S29AL032D90TFI030,TSOP,48 PIN,BK
..3	U4	EUSY0006501	IC,RESET 2.7V	KIA7027F,SOT-89,3PIN
..3	U5	EUSP0116801	IC,PBX,16/BUFFER/DRIVER 3-STATE	IDT74LVC16244APAG,TSSOP,48 PIN
..3	U6	EUSY0222801	IC,VOICE OVER PACKET PROCESSOR	AC48204AE3-CBL,PBGA,144 PIN
..3	U7	EUCA9002801	IC,ASIC	ACT-2,0.2,MQFP,240 PIN,ETC
..3	U8	EUSP0117101	IC,PBX,16/BUS TRANSCEIVER	ID74LVC16245APAG,TSSOP,48 PIN
..3	U9-11,U15,U48	EUSY0049301	IC,LOW-VTG QUAD 2-INPUT AND GATE	TC74LCX08FT,TSSOP,14 PIN
..3	U12	EUSY0049101	IC,3A LDO REGULATOR	FAN1587AM33X,TO-263,3 PIN,PB-FREE
..3	U18	EUSY9291101	IC	K9F5608U0D-PCB0,TSOP1,48 PIN
..3	U20	EUSY0093701	IC,LOW VOLTAGE CMOS HEX SCHMITT INVERTER	MC74LCX14DTR3,TSSOP,14 PIN,PB-FREE
..3	U22-23,U46	EUSY0050701	IC,LOW EMI SPECTRUM SPREAD CLOCK	CYIFS781BSXC,SOIC,8 PIN
..3	U47,U112	99999999999	NOT ASSEMBLE	NOT ASSEMBLE

Level	Location No	Part No	Description	Specification
..3	U49	EUSY0085301	IC,LOW VOLTAGE CMOS OCTAL BUFFER	MC74LCX541DTR2G,TSSOP,20 PIN,3-STATE
..3	U51	EUSY0109302	IC,4Mb Async.Fast SRAM	K6R4016V1D-UI10,TSOP2,44 PIN
..3	U52	EUSY0270801	IC,3.3V Single Power Phy	KSZ8721SL,SSOP,48 PIN,Pb Free
..3	U53	EUSY0049401	IC,LOW-VTG QUAD 2-INPUT OR GATE	TC74LCX32FT,TSSOP,14 PIN
..3	U54	EUCA9002901	IC,ASIC	LFEC1E-3TN100C,,LFQFP,100 PIN,ETC
..3	U55	EUSY0255301	IC,1.2V/150mA,LDO withPowerGood	MIC5248-1.2YM5,SOT23,5 PIN
..3	U113	EUSY0049701	IC,OCTAL BUS BUFFER/NON INVERTING	TC74ACT541FT,TSSOP,20 PIN
..3	U114	EUSY0211801	IC,LOW-POWER DC-DC CONVERTER	TPS62000DGS,MSOP,10 PIN
..3	X1	EXSY0001401	OSCILLATOR,10MHZ	KMS-873C,10 MHz,50 PPM,15 pF,SMD,7.0*5.0*1.7
..3	X2	EXSY0001201	OSCILLATOR,32.768MHZ	KMS-870R,25PPM,15pF,SMD,7.0*5.0*1.7
..3	X4	EXXY0005801	X-TAL,25MHZ	HC-49/SM,50PPM,20pF,50ohm,SMD,11.4*4.67*3.4
..3	X5	EXSY0001901	OSCILLATOR	SCO-10350SR-20.000M,20.000MHz,50 PPM,pF,SMD
..3	L1	ELCP0007101	INDUCTOR,SMD,POWER	BDS-5627E-100M,10 uH,M,0.065DCR MAX0.95A
..3	L2	SFBY0000101	FILTER,BEAD	SFBY0000101,4.06*3.05*2.54,3A,ED3863-S/SMT
..3	ZD2	EDTY0000501	DIODE,TVS	P6SMBJ6.0A,DO-214AA,6V,600W,R/TP
..3	ZD3	EDNY0001803	DIODE,ZENER	BZX84C5V1LTG1,SOT-23,5.1V,.35W,PB-FREE
..3	D1	EDSY0002901	DIODE,SWITCHING	KDS193,SOT-23,85V,0.3A,R/TP
..3	D4	EDSY0002101	DIODE,SWITCHING	FM140,SMD,40V,1A,R/TP
..3	LD1-11	EDLH0001301	DIODE,LED,CHIP	PG1102W-TR,GREEN,ETC,R/TP,3015
..3	SW1	ESCY0000901	SWITCH,TACT	EVQ QG3 03W,15V,20mA,HORIZONTAL,G,LIGHT TOUCH
..3	FB1-2,FB4-6	SFBH0007401	FILTER,BEAD,CHIP	HB-1M1608- 121JT,120 ohm,1608
..3	FB3	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	FB7,FB9	SFBH0001204	FILTER,BEAD,CHIP	HB-1M1608-301JT,300 ohm,1608 ,
..3	FB8,FB14,R181	SFBH0007401	FILTER,BEAD,CHIP	HB-1M1608- 121JT,120 ohm,1608
..3	FB10-13	SFBH0002001	FILTER,BEAD,CHIP	HB-1M1608-102JT,1000 ohm,1608
..3	C1-2	ECCH0000240	CAP,CERAMIC,CHIP	330pF 50V
..3	C3,C11-16,C18	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C5-7,C24,C84-85	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C17,C39,C41,C141	ECTH0000126	CAP,TANTAL,CHIP	10uF 6.3V
..3	C19,C139	ECCH0000277	CAP,CERAMIC,CHIP	470pF 50V
..3	C20,C93,C113	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C21,C61-64,C66-70	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C22-23,C26-38	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C25	ECTH0000114	CAP,TANTAL,CHIP	2.2uF 20V
..3	C43-46,C71-83	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C65	ECCH0000214	CAP,CERAMIC,CHIP	12pF 50V
..3	C92,C95-101	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C94,C102,C109	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C103-108,C110,C115	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C111	ECCH0000222	CAP,CERAMIC,CHIP	33pF 50V
..3	C112,C181-182	ECCH0000218	CAP,CERAMIC,CHIP	22pF 50V
..3	C114,C116	ECTH0000125	CAP,TANTAL,CHIP	10uF 6.3V
..3	C117-118,C121-129	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C130,C137	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V

Level	Location No	Part No	Description	Specification
..3	C131-136,C144	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C138,C142,C145	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C140,C164-165	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C161-163,C186	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C166	ECCH0000247	CAP,CERAMIC,CHIP	1nF 50V
..3	C167-168	ECCH0000255	CAP,CERAMIC,CHIP	4.7nF 50V
..3	C169-172,C220	ECCH0000210	CAP,CERAMIC,CHIP	7pF 50V
..3	C173-174	ECCH0000284	CAP,CERAMIC,CHIP	470000pF 10V
..3	C183-185	ECTH0000144	CAP,TANTAL,CHIP	100uF 10V
..3	C187,C189,C212	ECTH0000124	CAP,TANTAL,CHIP	10uF 16V
..3	C188,C215	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C194-195,C213-214	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	C196-210,C217-219	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C211	ECCH0000283	CAP,CERAMIC,CHIP	1uF 16V
..3	C221	ECTH0000204	CAP,TANTAL,CHIP	47uF 6.3V
..3	C222-224	ECTH0001701	CAP,TANTAL,CHIP	10uF 6.3V
..3	C225	ECCH0000253	CAP,CERAMIC,CHIP	3.3nF 50V
..3	R1-21,R191-193	ERHY0000410	RES,CHIP	22 1/16W
..3	R26-31,R34-43	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	R44-53,R106-107	ERHY0000401	RES,CHIP	0 1/16W
..3	R54,R109-111,R117	ERHY0000466	RES,CHIP	10K 1/16W
..3	R55-86	SFBH0001202	FILTER,BEAD,CHIP	HB-1M1608-800JT,80 ohm,1608
..3	R87-104	ERHY0000426	RES,CHIP	120 1/16W
..3	R105	ERHY0000447	RES,CHIP	1.5K 1/16W
..3	R118-133,R201	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R134-155,R159-163	ERHY0000466	RES,CHIP	10K 1/16W
..3	R164-165,R225-227	ERHY0000401	RES,CHIP	0 1/16W
..3	R166-179,R202,R204	ERHY0000466	RES,CHIP	10K 1/16W
..3	R180,R212-219	ERHY0000434	RES,CHIP	330 1/16W
..3	R194,R242,R337	SFBH0002001	FILTER,BEAD,CHIP	HB-1M1608-102JT,1000 ohm,1608
..3	R195-196,R199	ERHY0009568	RES,CHIP	33 1/10W
..3	R197,R245,R340	ERHY0000454	RES,CHIP	3.3K 1/16W
..3	R198,R224,R243,R280	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R203	ERHY0000439	RES,CHIP	560 1/16W
..3	R220-223,R303	ERHY0000466	RES,CHIP	10K 1/16W
..3	R228-231,R279	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R244,R246-278	ERHY0000412	RES,CHIP	33 1/16W
..3	R281,R283,R285,R288	ERHY0000401	RES,CHIP	0 1/16W
..3	R282,R284,R290,R341	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R286,R305,R320-327	ERHY0000420	RES,CHIP	68 1/16W
..3	R287	ERHY0000443	RES,CHIP	820 1/16W
..3	R291,R293,R295	ERHY0000401	RES,CHIP	0 1/16W
..3	R294,R418	ERHY0000410	RES,CHIP	22 1/16W
..3	R301-302,R316-317	ERHY0000401	RES,CHIP	0 1/16W

Level	Location No	Part No	Description	Specification
..3	R304,R345,R419-420	ERHY0000450	RES,CHIP	2.2K 1/16W
..3	R306-315,R318-319	ERHY0000466	RES,CHIP	10K 1/16W
..3	R328-329,R350-356	ERHY0000466	RES,CHIP	10K 1/16W
..3	R330,R334	ERHY0000445	RES,CHIP	1K 1/16W
..3	R331,R347,R357	ERHY0000440	RES,CHIP	620 1/16W
..3	R332-333,R335-336	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R338-339,R456	ERHY0000412	RES,CHIP	33 1/16W
..3	R342-343	ERHY0000428	RES,CHIP	180 1/16W
..3	R348-349	ERHY0000420	RES,CHIP	68 1/16W
..3	R401-406,R410-411	ERHY0000445	RES,CHIP	1K 1/16W
..3	R407,R425	ERHY0000466	RES,CHIP	10K 1/16W
..3	R408-409	ERHY0000343	RES,CHIP	13K 1/16W
..3	R412,R444-445	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R413,R462	ERHY0000425	RES,CHIP	100 1/16W
..3	R414-417	ERHY0004101	RES,CHIP	49.9 1/10W
..3	R421-424,R448	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R431,R435-443	ERHY0000401	RES,CHIP	0 1/16W
..3	R434	ERHY0000340	RES,CHIP	10K 1/16W
..3	R446-447,R455	ERHY0000466	RES,CHIP	10K 1/16W
..3	R449-452,R454,R461	ERHY0000401	RES,CHIP	0 1/16W
..3	R453,R460	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R457	ERHY0000476	RES,CHIP	36K 1/16W
..3	R458	ERHY0000342	RES,CHIP	12K 1/16W
..3	R459	ERHY0000496	RES,CHIP	330K 1/16W
1		ABEZ9066202	BOX ASSY	IPLDK-60 AAFU STG ZZ,
.2		MBAA9001801	BAG,AIR CAP	AR-DPU2 STG ZZ,
.2		MBAD9008301	BAG,VINYL(PE)	AR-DPU2 STG ZZ,0.06t X 100 X 150
.2		MBEE9062701	BOX,MASTER	LDK-1248 AAFU RUS ZZ,
.2		MBEF9105801	BOX,UNIT	AR-DPU2 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,NORTEL LVP2890 BOX BARCODE
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,
1		ABAZ0007307	BAG ASSY	IPLDK-60 V0IB STG ZZ,ipLDK-60 Bag Ass'y(V0IB)
.2		GMFY0001801	SCREW MACHINE,PAN	GMFY0001801,3MM,6MM,SB41(FZY),B,+,KB1023 M3X6 SZ
.2		MBAD0002408	BAG,VINYL(PE)	ZZ,UNDERAY X DX A
.2		MMCY9001001	MOUNTING SCREW	IPLDK-60 V0IB STG SV,Mounting Screw(M3x19.5)

5.9 VOIU

Level	Location No	Part No	Description	Specification
1		SAGY9252201	VOIU PCB ASSY,OPTION	IPLDK-60 VOIU STG,OPTION,1.0,
.2	CN1-2	ENBY0002401	CONNECTOR,BOARD TO BOARD	5084969-1,40 PIN,0.8 mm,BOTTOM,PLUG ASSEMBLY
.2		SAGA9056801	PCB ASSY,OPTION,AUTO	IPLDK-60 VOIU STG,OPTION,1.0,
..3	U1	EUSY0109302	IC,4Mb Async.Fast SRAM	K6R4016V1D-UI10,TSOP2,44 PIN
..3	U2	EUSY0222801	IC,VOICE OVER PACKET PROCESSOR	AC48204AE3-CBL,PBGA,144 PIN
..3	C1-15	ECCH0000272	CAP,CERAMIC,CHIP	0.1uF 25V
..3	C16-17	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	R3-13,R15-18	ERHY0000466	RES,CHIP	10K 1/16W
..3	R19-20,R26-27	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R22,R25	ERHY0000445	RES,CHIP	1K 1/16W
..3	R23	ERHY0000420	RES,CHIP	68 1/16W
..3	R28-31	ERHY0000401	RES,CHIP	0 1/16W
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,
1		ABEZ9066202	BOX ASSY	IPLDK-60 AAFU STG ZZ,
.2		MBAA9001801	BAG,AIR CAP	AR-DPU2 STG ZZ,
.2		MBAD9008301	BAG,VINYL(PE)	AR-DPU2 STG ZZ,0.06t X 100 X 150
.2		MBEE9062701	BOX,MASTER	LDK-1248 AAFU RUS ZZ,
.2		MBEF9105801	BOX,UNIT	AR-DPU2 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,LVP2890 BOX BARCODE LABEL

5.10 VMIU

Level	Location No	Part No	Description	Specification
1		SAGY9250601	VMIU PCB ASSY,OPTION	IPLDK-60 VMIU STG,OPTION,1.0
.2	CN1	ENNY0001909	CONNECTOR,HOUSING TO BOARD	PCN10C-32S-2.54DS,32PIN,2.54 mm,ANGLE,SOCKET
.2	CN2	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2		SAGA9055801	PCB ASSY,OPTION,AUTO	IPLDK-60 VMIU STG,OPTION,1.0,IPLDK-60 VMIU
..3	U1	EUSY0052001	IC,FIXED-POINT DSP	TMS320VC5402PGE100,TQFP,144 PIN
..3	U2	EUSY9291101	IC	K9F5608U0D-PCB0,TSOP1,48 PIN,R/TP
..3	U3	EUSY0049801	IC,LOW VTG OCTAL BUS TRANSCEIVER	TC74LCX245FT,TSSOP,20 PIN
..3	U5	EUSY0049401	IC,LOW-VTG QUAD 2-INPUT OR GATE	TC74LCX32FT,TSSOP,14 PIN
..3	U6	EUSY0093701	IC,LOW VOLTAGE CMOS HEX SCHMITT INVERTER	MC74LCX14DTR3,TSSOP,14 PIN,PB-FREE
..3	U7	EUSY0130003	IC,DC-DC CONVERTER	NCP1117ST18T3G,SOT-223,3 PIN,PB-FREE
..3	U8	EUSY0130001	IC,DC-DC CONVERTER	NCP1117ST33T3G,SOT-223,3 PIN,PB-FREE
..3	U9	EUSY0049301	IC,LOW-VTG QUAD 2-INPUT AND GATE	TC74LCX08FT,TSSOP,14 PIN
..3	X1	EXSY0001401	OSCILLATOR,10MHZ	KMS-873C,10 MHz,50PPM,15pF,SMD,7.0*5.0*1.7
..3	D1	EDSY0002101	DIODE,SWITCHING	FM140,SMD,40V,1A,R/TP
..3	C1-7,C9-14,C17	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C8,C15	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C16,C18,C21	ECTH0000124	CAP,TANTAL,CHIP	10uF 16V

Level	Location No	Part No	Description	Specification
..3	C19-20,C22-28,C31	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C29-30	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C32	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C33	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	R1-8,R11-24,R42	ERHY0000420	RES,CHIP	68 1/16W
..3	R9	ERHY0000434	RES,CHIP	330 1/16W
..3	R10	ERHY0000437	RES,CHIP	470 1/16W
..3	R33-41,R43-44	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R45-47	ERHY0000410	RES,CHIP	22 1/16W
..3	R48,R54,R60	ERHY0000401	RES,CHIP	0 1/16W
..3	R49,R61	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R50-53,R59	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R55	ERHY0000918	RES,CHIP	33 1/10W
..3	R56	ERHY0000425	RES,CHIP	100 1/16W
..3	R57	ERHY0000433	RES,CHIP	300 1/16W
..3	R58	ERHY0000449	RES,CHIP	2K 1/16W
..3	R62	ERHY0000323	RES,CHIP	1.5K 1/16W
..3	R63	ERHY0000454	RES,CHIP	3.3K 1/16W
1		ABEZ9066202	BOX ASSY	IPLDK-60 AAFU STG ZZ,
.2		MBAA9001801	BAG,AIR CAP	AR-DPU2 STG ZZ,
.2		MBAD9008301	BAG,VINYL(PE)	AR-DPU2 STG ZZ,0.06t X 100 X 150
.2		MBEE9062701	BOX,MASTER	LDK-1248 AAFU RUS ZZ,
.2		MBEF9105801	BOX,UNIT	AR-DPU2 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,LVP2890 BOX BARCODE LABEL
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,

5.11 AAFU

Level	Location No	Part No	Description	Specification
1		SAGY9252801	AAFU PCB ASSY,OPTION	IPLDK-60 AAFU STG,OPTION,1.0,IPLDK-60 AAFU
.2	CN1	ENNY0001909	CONNECTOR,HOUSING TO BOARD	PCN10C-32S-2.54DS,32 PIN,2.54 mm,ANGLE,SOCKET
.2	CN2	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
.2		SAGA9057301	PCB ASSY,OPTION,AUTO	IPLDK-60 AAFU STG,OPTION,1.0,IPLDK-60 AAFU
..3	U1	EUSY0052001	IC,FIXED-POINT DSP	TMS320VC5402PGE100,TQFP,144 PIN,BK
..3	U2	EUSY9291101	IC	K9F5608U0D-PCB0,TSOP1,48 PIN
..3	U3	EUSY0049801	IC,LOW VTG OCTAL BUS TRANSCEIVER	TC74LCX245FT,TSSOP,20PIN
..3	U5	EUSY0049401	IC,LOW-VTG QUAD 2-INPUT OR GATE	TC74LCX32FT,TSSOP,14 PIN
..3	U6	EUSY0093701	IC,LOW VOLTAGE CMOS HEX SCHMITT INVERTER	MC74LCX14DTR3,TSSOP,14 PIN,PB-FREE
..3	U7	EUSY0130003	IC,DC-DC CONVERTER	NCP1117ST18T3G,SOT-223,3 PIN,PB-FREE
..3	U8	EUSY0130001	IC,DC-DC CONVERTER	NCP1117ST33T3G,SOT-223,3 PIN,PB-FREE
..3	U9	EUSY0049301	IC,LOW-VTG QUAD 2-INPUT AND GATE	TC74LCX08FT,TSSOP,14 PIN

Level	Location No	Part No	Description	Specification
..3	X1	EXSY0001401	OSCILLATOR,10 MHz	KMS-873C 10MHZ,50 PPM,15 pF,SMD,7.0*5.0*1.7
..3	D1	EDSY0002101	DIODE,SWITCHING	FM140,SMD,40V,1A,R/TP
..3	C1-7,C9-14,C17	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C8,C15	ECTH0000117	CAP,TANTAL,CHIP	4.7uF 10V
..3	C16,C18,C21	ECTH0000124	CAP,TANTAL,CHIP	10uF 16V
..3	C19-20,C22-28,C31	ECCH0000271	CAP,CERAMIC,CHIP	0.1uF 16V
..3	C29-30	ECCH0000231	CAP,CERAMIC,CHIP	100pF 50V
..3	C32	ECCH0000259	CAP,CERAMIC,CHIP	10nF 50V
..3	C33	ECCH0001815	CAP,CERAMIC,CHIP	1nF 50V
..3	R1-8,R11-24,R42	ERHY0000420	RES,CHIP	68 1/16W
..3	R9	ERHY0000434	RES,CHIP	330 1/16W
..3	R10	ERHY0000437	RES,CHIP	470 1/16W
..3	R33-41,R43-44	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R45-47	ERHY0000410	RES,CHIP	22 1/16W
..3	R48,R61	99999999999	NOT ASSEMBLE	NOT ASSEMBLE
..3	R49,R54,R60	ERHY0000401	RES,CHIP	0 1/16W
..3	R50-53,R59	ERHY0000458	RES,CHIP	4.7K 1/16W
..3	R55	ERHY0000918	RES,CHIP	33 1/10W
..3	R56	ERHY0000425	RES,CHIP	100 1/16W
..3	R57	ERHY0000433	RES,CHIP	300 1/16W
..3	R58	ERHY0000449	RES,CHIP	2K 1/16W
..3	R62	ERHY0000323	RES,CHIP	1.5K 1/16W
..3	R63	ERHY0000454	RES,CHIP	3.3K 1/16W
1		ABEZ9066202	BOX ASSY	IPLDK-60 AAFU STG ZZ,
.2		MBAA9001801	BAG,AIR CAP	AR-DPU2 STG ZZ,
.2		MBAD9008301	BAG,VINYL(PE)	AR-DPU2 STG ZZ,0.06t X 100 X 150
.2		MBEE9062701	BOX,MASTER	LDK-1248 AAFU RUS ZZ,
.2		MBEF9105801	BOX,UNIT	AR-DPU2 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,FOR NORTEL LVP2890 BOX BARCODE
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,

5.12 CMU12PR

Level	Location No	Part No	Description	Specification
1		SAGY9252101	CMU12PR PCB ASSY,OPTION	IPLDK-60 CMU12PR STG,OPTION,1.0,NT-1248 CMU12PR
.2	CN9	ENCY9001401	CONNECTOR,BOX HEADER	HIF3H-6SA-2.54DSA,6 PIN,2.54 mm,STRAIGHT,NiP+AuP
.2	CN10	ENHY0001702	CONNECTOR,HEADER	HIF3H-20DA-2.54DSA,20PIN,2.54mm,STRAIGHT
.2		SAGA9056701	PCB ASSY,OPTION,AUTO	IPLDK-60 CMU12PR STG,OPTION,1.0,NT-1248 CMU12PR
..3	U1-2	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,PB-FREE
..3	U106	EUSY0031102	IC,LOGIC	HEF-4066BT,SOIC,14PIN
..3	U107-108	EUSY9299501	IC	CMX661D4,SOIC,16 PIN,ROHS
..3	X1	EXXY0002301	X-TAL,3.579545MHZ	HC-49/SM,50ppm,12pF,200ohm,SMD,11.4*4.67*40
..3	D1-6	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A,R/TP
..3	C1-6	ECCH0000360	CAP,CERAMIC,CHIP	22nF 50V
..3	C7	ECCH0000327	CAP,CERAMIC,CHIP	100pF 50V
..3	C9,C11	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C12-14	ECTH0000109	CAP,TANTAL,CHIP	1uF 16V
..3	C15-20	ECCH0000368	CAP,CERAMIC,CHIP	0.1uF 50V
..3	R1-6,R11-16,R41-46	ERHY0001034	RES,CHIP	5.1M 1/10W
..3	R21-26,R31-36	ERHY0001023	RES,CHIP	1.0M 1/10W
..3	R51-53	ERHY0000981	RES,CHIP	20K 1/10W
..3	R54-56	ERHY0000960	RES,CHIP	2.4K 1/10W
..3	R57-63	ERHY0000692	RES,CHIP	100K 1/10W
..3	R64-66	ERHY0000987	RES,CHIP	36K 1/10W
..3	R67-68	ERHY0000999	RES,CHIP	100K 1/10W
..3	R69-70	ERHY0000901	RES,CHIP	0 1/10W
..3	R71-72	ERHY0000975	RES,CHIP	10K 1/10W
1		ABEZ9066202	BOX ASSY	IPLDK-60 AAFU STG ZZ,
.2		MBAA9001801	BAG,AIR CAP	AR-DPU2 STG ZZ,
.2		MBAD9008301	BAG,VINYL(PE)	AR-DPU2 STG ZZ,0.06t X 100 X 150
.2		MBEE9062701	BOX,MASTER	LDK-1248 AAFU RUS ZZ,
.2		MBEF9105801	BOX,UNIT	AR-DPU2 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,LVP2890 BOX BARCODE LABEL
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,

5.13 CMU50PR

Level	Location No	Part No	Description	Specification
1		SAGY9252301	PCB ASSY,OPTION	IPLDK-60 CMU50PR STG,OPTION,1.0,
.2	CN9	ENCY9001401	CONNECTOR,BOX HEADER	HIF3H-6SA-2.54DSA,6PIN,2.54mm,STRAIGHT,NiP+AuP
.2	CN10	ENHY0001702	CONNECTOR,HEADER	HIF3H-20DA-2.54DSA,20PIN,2.54mm,STRAIGHT
.2		SAGA9056901	PCB ASSY,OPTION,AUTO	IPLDK-60 CMU50PR STG,OPTION,1.0,
..3	U1-3	EUSY0036702	IC,COMPARATOR	LM2903MX,SOIC,8 PIN,PB-FREE
..3	D1-9	EDSY0003001	DIODE,SWITCHING	KDS226-RTK(THAILAND),SOT-23,85V,0.1A
..3	C1-6	ECCH0000360	CAP,CERAMIC,CHIP	22nF 50V
..3	C11,C13,C15	ECCH0000356	CAP,CERAMIC,CHIP	10nF 50V
..3	C12,C14,C16	ECTH0000118	CAP,TANTAL,CHIP	4.7uF 16V
..3	C21,C23,C25	ECCH0000369	CAP,CERAMIC,CHIP	0.1uF 50V
..3	C22,C24,C26	ECZH0006001	CAP,CHIP,MAKER	1nF 2KV
..3	R1-6,R11-16,R41-46	ERHY0001034	RES,CHIP	5.1M 1/10W
..3	R21-26,R31-36	ERHY0001023	RES,CHIP	1.0M 1/10W
..3	R51-53	ERHY0000981	RES,CHIP	20K 1/10W
..3	R61-66,R71-76	ERHY0001034	RES,CHIP	5.1M 1/10W
..3	R81-86	ERHY0001005	RES,CHIP	180K 1/10W
..3	R91-96	ERHY0000969	RES,CHIP	5.6K 1/10W
..3	R97-99	ERHY0001008	RES,CHIP	240K 1/10W
..3	R100-102	ERHY0000975	RES,CHIP	10K 1/10W
1		ABEZ9066202	BOX ASSY	IPLDK-60 AAFU STG ZZ,
.2		MBAA9001801	BAG,AIR CAP	AR-DPU2 STG ZZ,
.2		MBAD9008301	BAG,VINYL(PE)	AR-DPU2 STG ZZ,0.06t X 100 X 150
.2		MBEE9062701	BOX,MASTER	LDK-1248 AAFU RUS ZZ,
.2		MBEF9105801	BOX,UNIT	AR-DPU2 STG ZZ,
1		MLAC9006303	LABEL,BARCODE	LVP-2890 USA MS,WA,LVP2890 BOX BARCODE LABEL
1		MLAC9006304	LABEL,BARCODE	IPLDK-60 BKSU STG WA,