T805 Quasi-Synchronous Transmission System Service Manual

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About This Manual

Scope

This manual contains general, technical and servicing information on the T805 Quasi-Synchronous Transmission System and covers all Version 2 and earlier software.

Format

We have published this manual in a ring binder so that "revision packages" containing additional information pertaining to new issues of PCBs can be added as required.

Revision Packages

Revision packages will normally be published to coincide with the release of information on a new PCB, and may also contain additions or corrections pertaining to other parts of the manual.

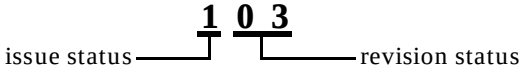
If you return the address card at the front of this manual, you will be notified when revision packages containing new PCB information and/or text are available. You may then order as many packages as you require from your local Tait Company. Revision packages are supplied ready-punched for inclusion in your manual.

Revision Control

Each page in this manual has a date of issue. This is to comply with various Quality Standards, but will also serve to identify which pages have been updated and when. Each page and its publication date is listed in the "List of Effective Pages", and a new list containing any new/revised pages and their publication dates will be sent with each revision package.

Any portion of text that has been changed is marked by a vertical line (as shown at left) in the outer margin of the page. Where the removal of an entire paragraph means there is no text left to mark, an arrow (as shown at left) will appear in the outer margin. The number beside the arrow will indicate how many paragraphs have been deleted.

The manual issue and revision status are indicated by the last three digits of the manual IPN. These digits start at 100 and will increment through 101, 102, 103, etc., as revision packages are published, e.g:



Thus, Issue 103 indicates the third revision to issue 1 and means that three packages should have been added to the manual. The issue digit will only change if there is a major product revision, or if the number of revision packages to be included means that the manual becomes difficult to use, at which point a new issue manual will be published in a new ring binder.

PCB Information

PCB information is provided for all current issue PCBs, as well as all previous issue PCBs manufactured in production quantities, and is grouped according to PCB. Thus, you will find the parts list, grid reference index (if necessary), PCB layouts and

circuit diagram(s) for each individual PCB grouped together.

Errors If you find an error in this manual, or have a suggestion on how it might be improved, please do not hesitate to contact the Technical Writer, Tait Radio Infrastructure Division, Tait Electronics Ltd, P.O. Box 1645, Christchurch, New Zealand.

Technical Information

Any enquiries regarding this manual or the equipment it describes should be addressed in the first instance to your nearest approved Tait Dealer or Service Centre. Further technical assistance may be obtained from the Customer Support Group, Tait Radio Infrastructure Division, Tait Electronics Ltd, Christchurch, New Zealand.

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In the interests of improving performance, reliability or servicing, Tait Electronics Ltd reserve the right to update their equipment and/or manuals without prior notice.

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Service Manuals should be ordered from your nearest Tait Branch or approved Dealer. When ordering, quote the Tait Internal Part Number (IPN) and, where applicable, the version.

Date Of Issue

IPN M805-06-100 T805 Quasi-Synchronous Transmission System Service Manual

Issue 100 published October 1996

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1 General Information

This section provides a brief description of the Quasi-Synchronous system, along with general safety information and detailed specifications on the units that make up the system.

The following topics are covered in this section.

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1.1 Introduction

The T805 Quasi-Synchronous System is a modular audio signal processing system incorporating Digital Signal Processing (DSP) technology to form a versatile and expandable system which allows the transmission of information over a series of transmitters, all of which are operating on the same RF frequency.

The T805 system is composed of T805 Audio Signal Processing (ASP) cards which are programmed to perform one of four functions:

- Test Signal Generator Module (TSGM)
- Line Interface Module (LEM)
- Audio Inversion Module (AIM)
- Audio Recovery Module (ARM).

The T805 Quasi-Synchronous System can support up to eight independent Quasi-Synchronous networks, each with either one or two TSGMs. The number of LEMs in each is variable as long as the total number of LEMs used in the system does not exceed 222.

For every AIM used a corresponding ARM is required. The number of AIM / ARM combinations is dependent on the system organisation.

The T805 Quasi-Synchronous system is housed in one or more 6U, 483mm rack frames. Each rack frame has a backplane PCB (T805-04) and slots for up to 9 ASP cards. When the physical capacity of a rack frame has been exceeded, an additional rack frame may be easily added until the maximum number of TSGM(s) and LEMs has been fitted. When a remotely located AIM or ARM site is required, the ASP card is housed in a T805-06 1U rack.

Overall control of the system is by means of an IBM[1] compatible 80386 (or better) based computer linked to each TSGM or LEM via an RS-485 serial communications link. The "System Controller" co-ordinates the training procedure when it is initiated. Information on the Quasi-Synchronous System Controller is contained in a separate manual.

The AIMs and ARMs are controlled via signalling down the audio line and so operate independently of the System Controller.

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1.2 System Specifications

1.2.1 Introduction

The specification figures given are minimum figures, unless otherwise indicated, for equipment operating at standard room temperature (+22°C to 28°C) with a humidity level of less than 60%.

Details of test methods and the conditions which apply for Type Approval testing in all countries can be obtained from Tait Electronics Ltd.

1.2.2 Quasi-Synchronous System Controller

Quasi-Synchronous System Controller	..	IBM[1] compatible 80386 (or better) based computer
Communication with TSGM & LEM Cards	..	serial via ACL II interface board
Type Of Communication	..	RS-485
Data Rate	..	2400 baud
Power Supply	..	230V AC, 50 Hz

1.2.3 Quasi-Synchronous System - General

Types Of System Cards	..	Test Signal Generator Module (TSGM)
	..	Line Equaliser Module (LEM)
	..	Audio Inversion Module (AIM)
	..	Audio Recovery Module (ARM)
Maximum Number Of TSGMs Per Network	..	2 (main and back-up)
Maximum Number Of Networks Per System	..	8
Maximum Number Of LEMs Per System	..	222
Maximum Number Of LEMs Per Network	..	222
Power Supply	..	+13.8V DC (nominal)
Processor	..	TMS320C26 digital signal processor

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Clock Frequency	..	40.00MHz
A / D Sampling Rate	..	11.57kHz
ASP Rack Frame Housing	..	483mm, 1U or 6U high
ASP Card Dimensions	..	233mm x 210mm
Maximum Number Of System Cards Per Rack Frame	..	9
Power Supply Requirements[2]	..	+13.8V DC supply capable of supplying 9A per rack
Operating Temperature Range	..	0°C to +55°C

1.2.4 Audio Interface Card - TSGM

Maximum Number Of TSGMs Per Network	..	2 (main plus back-up)
Audio Interfaces:		
Inputs:		
Quasi-Synchronous Audio (From RIC)	..	600Ω balanced via rack
External CTCSS (Optional)	..	47kΩ balanced
Outputs:		
LF Training Signal / CTCSS	..	600Ω balanced via rack
HF Training Signal / Q-S Audio	..	600Ω balanced via rack
Audio Bandwidth	..	67Hz to 3kHz or 67Hz to 2550Hz (depending on configuration)
Signal To Noise Ratio	..	>50dB
Distortion	..	<1%
Audio Input And Output Levels	..	-10dBm nominal into a 600Ω balanced load
Maximum Audio Input And Output Levels	..	0dBm into a 600Ω balanced load
Digital Inputs	..	"ICCS" (breakout)
Switching Outputs (Open Collector)	..	"DIGOUT" (training pulse)
Communication With Q-S Controller	..	RS-485 2400 baud

1.2.5 Audio Interface Card - LEM

Maximum Number Of LEMs Per System .. 222

Maximum Number Of LEMs Per Network .. 222

Audio Interfaces:

Inputs:

High Frequency Training Audio / Quasi-Synchronous Audio	..	47kΩ balanced
Low Frequency Training Audio / CTCSS	..	47kΩ balanced
Test Receiver Audio	..	600Ω balanced via rack
RIC (Breakout) Audio	..	600Ω balanced via rack

Outputs:

LEM Audio Out	..	600Ω balanced

Audio Bandwidth .. 300Hz to 3kHz or 67Hz to 3kHz depending on input or output

Signal To Noise Ratio .. >50dB

Distortion .. <1%

Input And Output Levels .. -10dBm nominal into a balanced load

Maximum Audio Input And Output Levels .. 0dBm into a 600Ω balanced load

Digital Inputs .. "GPS" (sample training tone)
.. "ICCS" (breakout)

Communication With Q-S Controller .. RS-485

1.2.6 Audio Interface Card - AIM

Audio Interfaces:

Input:

Audio In	..	600Ω balanced via rack

Output:

Audio Out	..	600Ω balanced via rack

Bandwidth:

Input	..	67Hz to 2550Hz (speech, CTCSS) 67Hz to 3kHz (speech, CTCSS and control signals)
Output	..	350 Hz to 2833Hz (speech, CTCSS) 350Hz to 3kHz (speech, CTCSS and control signals)

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Signal To Noise Ratio	..	>50dB
Distortion	..	<1%
Input And Output Levels	..	-10dBm nominal into a balanced load
Maximum Audio Input And Output Levels	..	0dBm into a 600Ω balanced load
Digital Inputs / Outputs	..	"ICCS" (transmitter key input)
Communication With Quasi-Synchronous System Controller	..	not required
Control Of Operating Modes	..	audio signalling down the line

1.2.7 Audio Interface Card - ARM

Audio Interfaces:

Input:

Audio In	..	600Ω balanced via rack

Outputs:

Audio Out (+ Optional Keytone)	..	600Ω balanced
CTCSS	..	600Ω balanced

Audio Bandwidth:

Input (Speech, CTCSS & Control Signals)	..	350Hz to 3kHz
Outputs:		
Audio Out	..	67Hz to 2550Hz
CTCSS	..	67Hz to 300Hz
Keytone (Optional)	..	2970Hz
Signal To Noise Ratio	..	>50dB
Distortion	..	<1%
Input And Output Levels	..	-10dBm nominal into a balanced load
Maximum Audio Input And Output Levels	..	0dBm into a 600Ω balanced load
Digital Outputs (Open Collector)	..	"DIGOUT" (transmitter key)
Communication With Quasi-Synchronous System Controller	..	not required
Control Of Operating Modes	..	audio signalling down the line

1.2.8 T805-04 Backplane

Maximum Number Of ASP Cards Per Rack	..	9
Power Supply[2]	..	+13.8V DC capable of supplying 9A per rack
Audio Interfaces	..	buffer amps for linking to next rack in series
Termination Types:		
Audio	..	terminal blocks
RS-485	..	9-pin D-range
Series Link To Other Racks	..	34-way IDC

1.2.9 T805-06 1U Rack

Maximum Number Of ASP Cards Per Rack	..	1
Type of ASP Cards To Be Fitted	..	T805-01 AIM
	..	T805-01 ARM
Power Supply[2]	..	+13.8V DC capable of supplying 1A
Input Signals	..	Telecom 4W[3]
	..	monitor receiver audio
Output Signals	..	Telecom 4W
	..	transmit audio
	..	transmit CTCSS / low frequency training tones
Termination Types:		
Audio	..	terminal blocks
Telecom	..	via Line Barrier Unit[3]

1.2.10 AIM-ARM Communications Link

Type Of Link	..	Telecom 4-wire
Line Type	..	private speech band circuits of keyline-3 specification or similar
Interface[3]	..	line barrier units (type CYFAS 88 / 0507[3])

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1.2.11 System Power Supply Requirements[2]

Supply Type	.. T807
Supply Voltage	.. +13.8V (nominal)
Supply Current	.. 9.0A per rack (9 ASP cards)

1 IBM is a trademark of International Business Machines.

2 **Regulatory Requirements**

When the T805 system is linked into the Telecom system (AIM-ARM links), the power supply must meet the approval requirements of that country.

In the UK the T807 meets the necessary requirements (EN41003). BABT approval (BS6328) will be invalidated unless the T805 system is used in conjunction with the approved items.

See Section 1.3 Warnings.

3 **Regulatory Requirements**

Where an AIM-ARM link is used for linking into a Telecom system, the T805 system must meet the approval requirements of that country.

In the UK the T805 system is approved for indirect connection into the Telecom speech band circuits (BS6328). Where signalling is required, a nominal frequency of 2280Hz is used.

See Section 1.3 Warnings.

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1.3 Warnings

1.3.1 Introduction

The following information applying to the T805 Quasi-Synchronous System relates to the British Telecom Standards EN41003 and BS6328.

Failure to adhere to any of the following will invalidate the relevant approvals for the T805 System.

1.3.2 Installation

This equipment shall be installed and adjusted only by a professional installer or maintenance technician.

In the United Kingdom the T805 Quasi-Synchronous System may be connected only to other BABT approved apparatus.

1.3.3 Power Supplies

The T805 Quasi-Synchronous system is approved for use with the T807 power supply. Any other power supply used will invalidate the approval given to this system if, as a result, it ceases to comply with EN41003, to which it is approved.

The mains outlet socket for the T807 power supply should be accessible at all times as disconnection of the T807 from the mains supply is only accomplished by full removal of the mains plug. The switch on the front panel of the T807 ***does not*** effect complete removal from the mains.

1.3.4 Line Barrier Units

Where an AIM-ARM combination is used for linking into a Telecom system, the T805 system must meet the approval requirements of that country.

In the UK the T805 system is approved for indirect connection into the Telecom speech band circuits (BS6328). Where signalling is required, a nominal frequency of 2280Hz is used. It requires no signalling in the frequency range 2220Hz to 2340Hz. No signalling below 200Hz is presented to the Telecom network.

The T805, as supplied with line barriers, is suitable for direct connection to speech band

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circuits or relevant branch systems for speech band circuits. It may be connected to 4W Private Speech Band circuits. It must only be used in conjunction with the protection barrier(s) specified in the instructions for use.

The T805 is also suitable for point to point circuits.

The T805 is BABT approved for use only with the CYFAS 88/0507 Line Barrier Unit. Approval will be invalidated unless the T805 is used in conjunction with this barrier.

1.3.5 Wiring Between Line Barrier Unit And The T805 System

Connection to the speech band circuit is from the terminal blocks in the CYFAS Line Barrier unit (type 88/0507), via cable with solid copper conductors of nominal diameter between 0.4mm and 0.6mm. Refer to Section 7 for installation details.

Note that some methods of connection to the network or circuit are the responsibility of the public telecommunications operator or a person authorised by that operator.

If any other apparatus, including cable or wiring, is to be connected to any speech band circuit, then all that other apparatus shall comply with the following;

1. The overall transmission characteristics of all the other apparatus shall be such as to introduce no material effect upon the electrical conditions presented to one another by the apparatus and the speech band circuit.

2. All other apparatus shall comprise only:

   (a) apparatus approved (see note) for the purpose of connection between the T805 and the speech band circuit;

   (b) cable or wiring complying with a code of practice for the installation of equipment covered by Section 9 of BS6328 or such other requirements as may be applicable.

1.3.6 ASP Cards

The T805 ASP cards are fitted with two non-volatile MK48Z18 RAMs (ICs 111 and 113). The non-volatile feature is achieved by the use of internally fitted Lithium batteries.

Do not dispose of the RAMs in fire or by any other means that could be hazardous.

1.3.7 Safety Status Of Ports

Definitions:

SELV Safety Extra-Low Voltage
TNV Telecommunications Network Voltage

Port safety status is defined in Table 1.1 below, and refers to the sample system configurations shown in Figure 1.1, 1.2, 1.3 and 1.4.

Configuration	Port	Function	Safety Status
Figure 1.1	(1,2)	breakout audio I/P	SELV
Figure 1.1	(3,7)	QS audio I/P	SELV
Figure 1.1	(5,6)	network port	TNV
Figure 1.1	(9,4)	network port, remote monitor receiver	TNV
Figure 1.1	10	signalling send	SELV
Figure 1.1	8	receive audio	SELV
Figure 1.1	maintenance port	system controller interface	SELV
Figure 1.1	PSU	mains I/P	excessive voltage
Figure 1.2	(1,2)	transmit/receive audio	SELV
Figure 1.2	(3,7)	training audio O/P	SELV
Figure 1.2	(9,4)	network port, remote monitor receiver	TNV
Figure 1.2	(5,6)	network port	TNV
Figure 1.2	10	signalling send	SELV
Figure 1.2	8	receive audio	SELV
Figure 1.2	maintenance port	system controller interface	SELV
Figure 1.2	PSU	mains I/P	excessive voltage
Figure 1.3	(1,2)	network port	TNV
Figure 1.3	3	receive audio	SELV
Figure 1.3	PSU	mains I/P	excessive voltage
Figure 1.4	(1,2)	network port	TNV
Figure 1.4	3	signalling send	SELV
Figure 1.4	PSU	mains I/P	excessive voltage

Table 1.1 Port Safety Status

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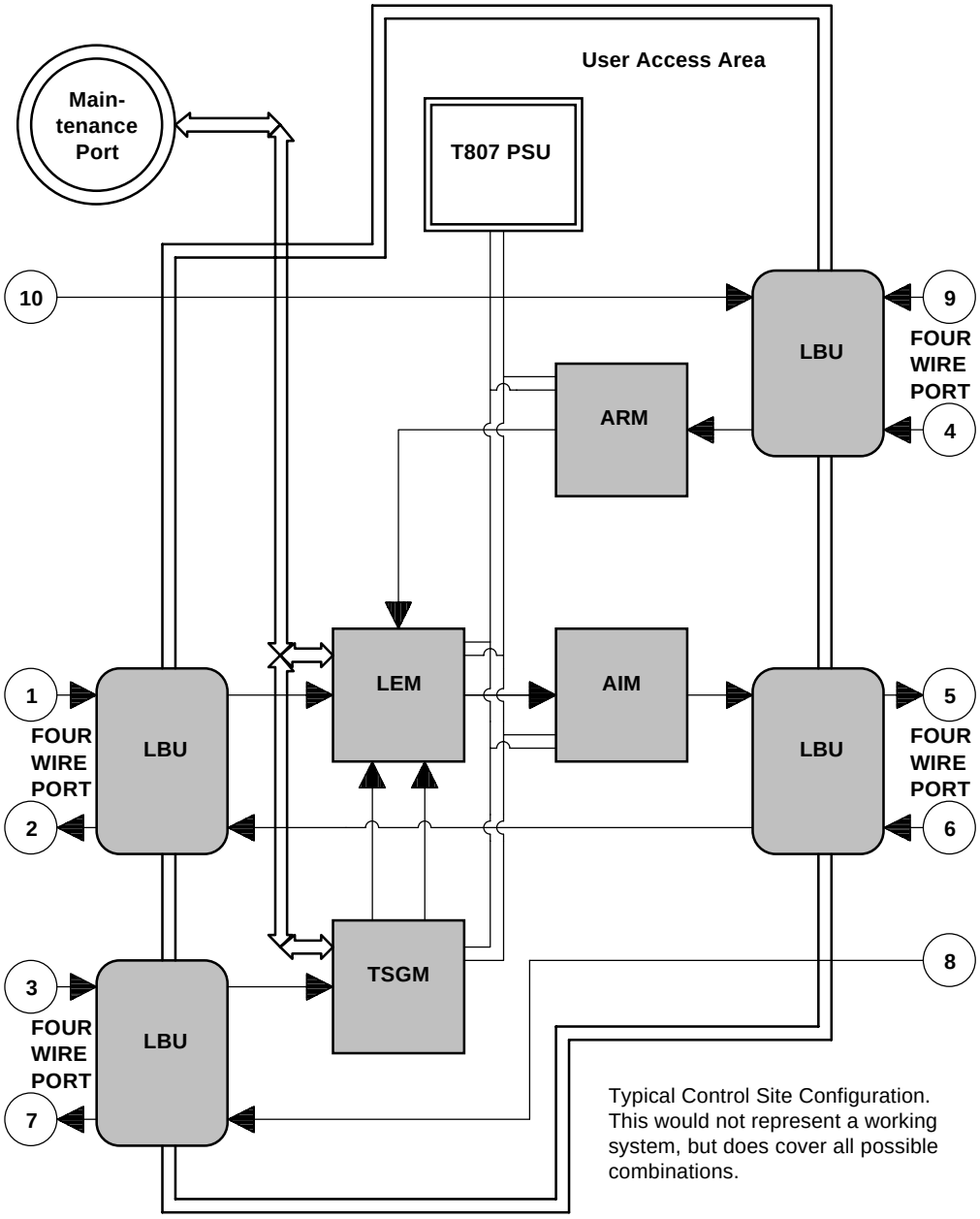
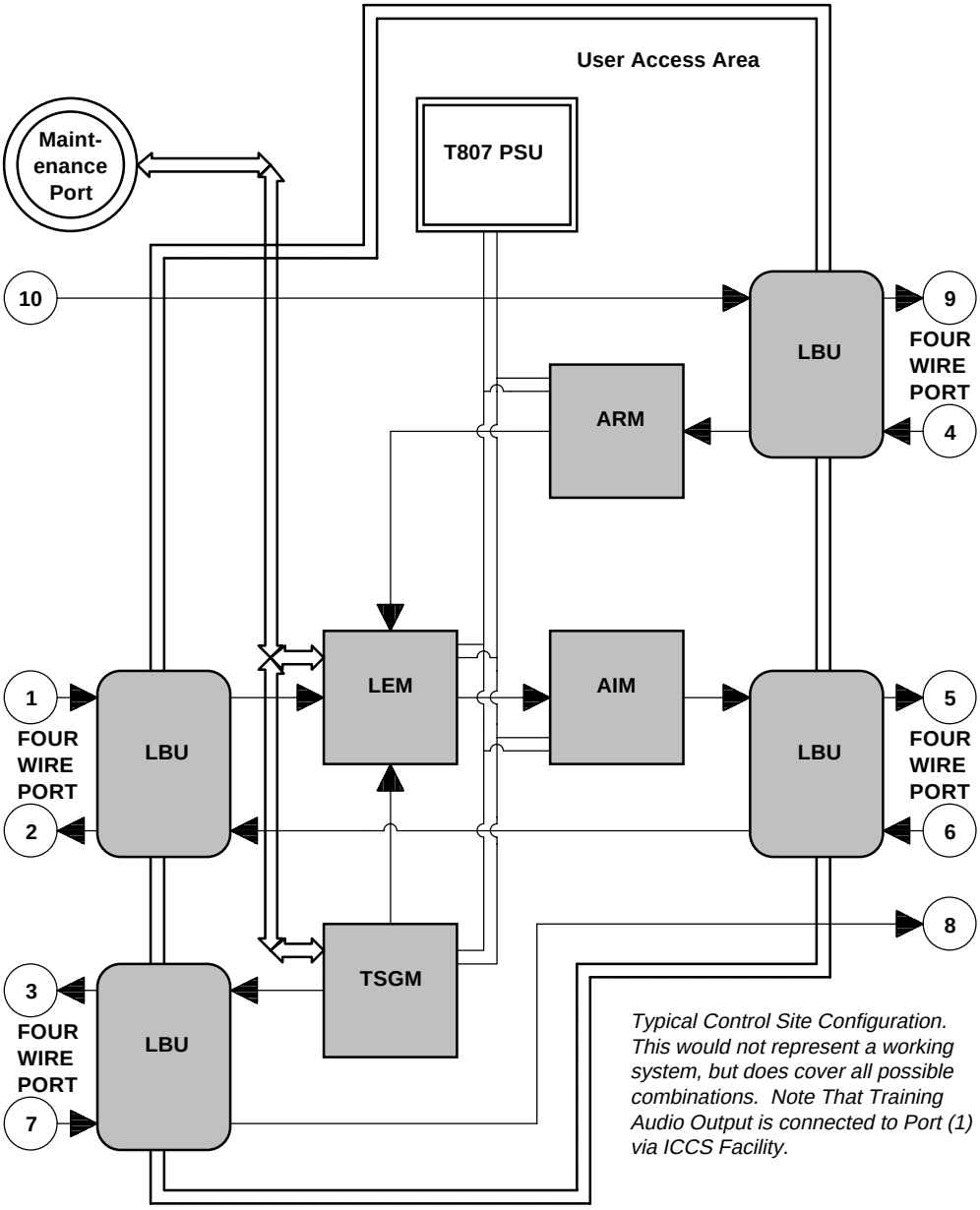


Note 1: Ports 1,2,3,7,8,10 are for connection to approved device or 600 ohm termination only

Figure 1.1 Sample Configuration (ADC-2)



Note 1: Ports 1,2,3,7,8,10 are for connection to approved device or 600 ohm termination only

Figure 1.2 Sample Configuration (ADC-1)

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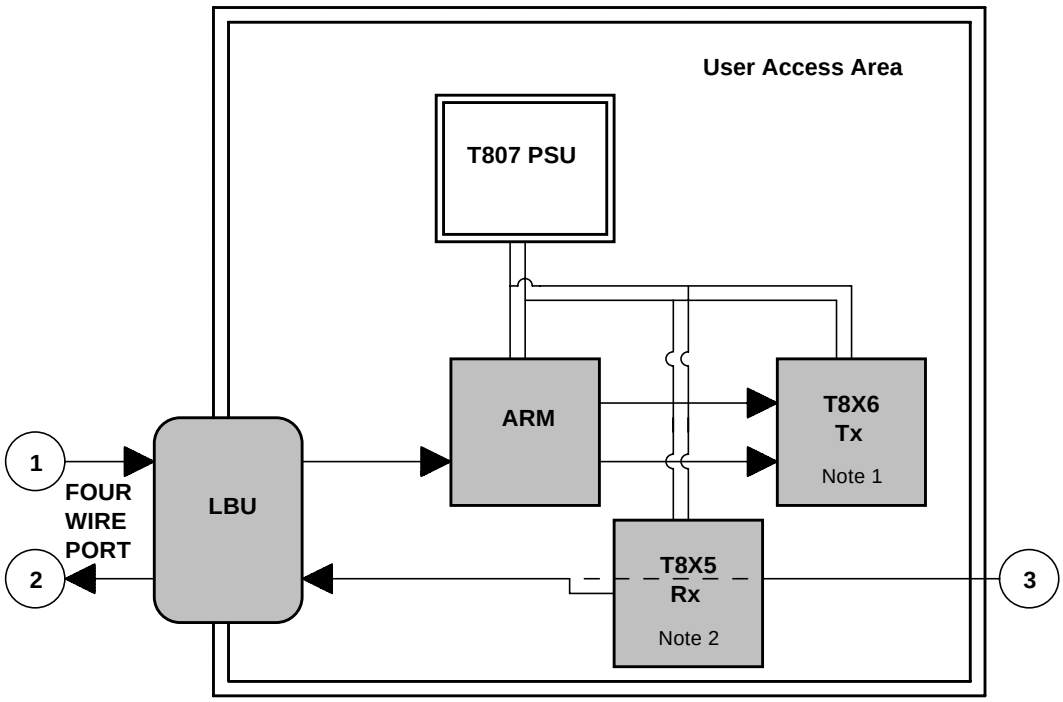

Note 1: T856 or any approved T800 series transmitter or 600 ohm termination.

Note2 : T855 or any approved T800 series receiver or 600 ohm termination.

Note3: Port 3 is for connection to a 600 termination or other approved device only if a T800 series receiver is not equipped.

Figure 1.3 Sample Configuration - Transmitter Site

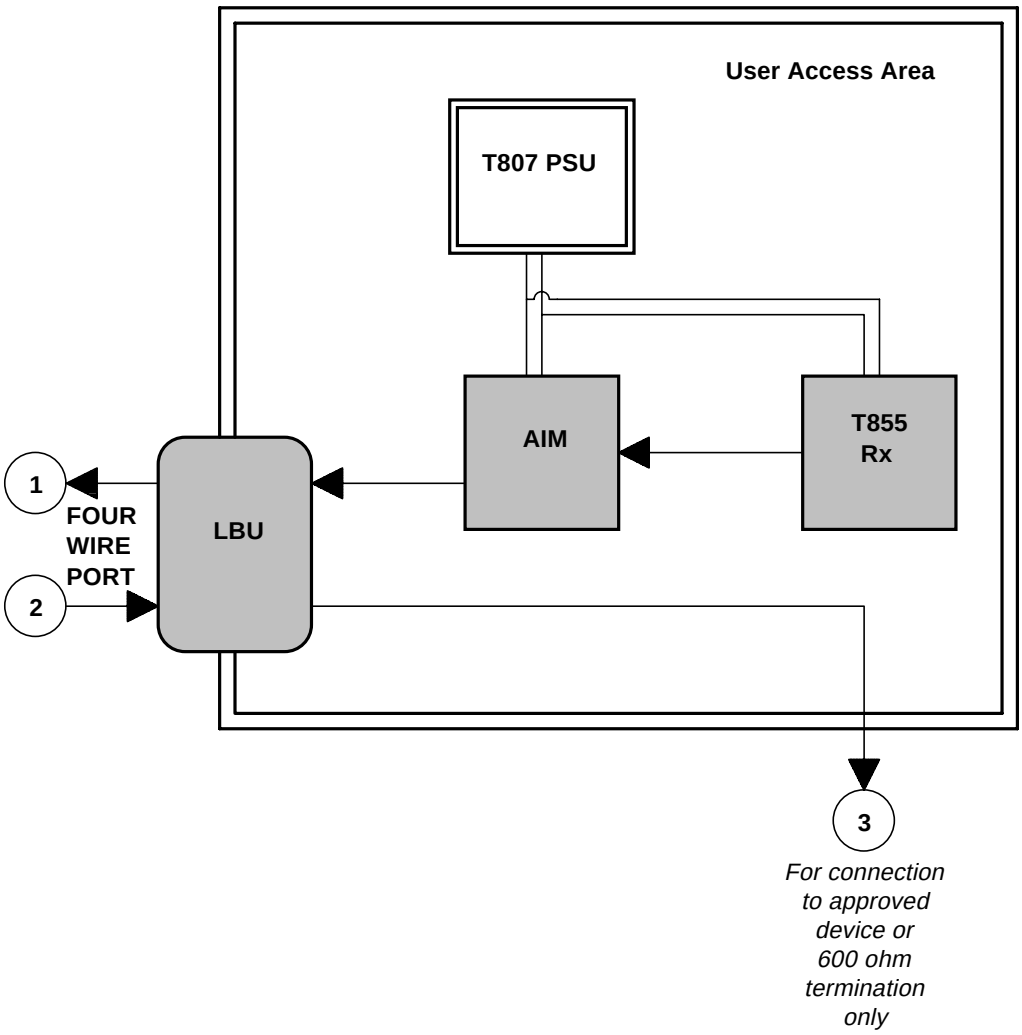

Figure 1.4 Sample Configuration - Remote Monitor Receiver Site

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1.4 Compliance With FCC Rules

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is used in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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2 System Description

This section introduces the Quasi-Synchronous concept and describes a typical system in general terms.

The following topics are covered in this section.

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2.1 An Introduction To The Quasi-Synchronous Concept

In areas where coverage is restricted by topographical features, it is often necessary to install more than one base station to enable adequate signals to be received at all points. These additional base stations can cause operational problems which require the use of different RF frequencies for each, or specialised techniques involving the Quasi-Synchronous method of operation.

The Quasi-Synchronous method of operation has been developed to provide a solution to the problems encountered when two or more transmitters operate on the same RF frequency and have coverage regions which overlap. Each transmitter carries the same information but has it processed so that identical audio is received in the overlap area. In order to implement this system, the signals received in the regions of overlap must be matched in terms of transmit frequency and amplitude, absolute & group delay of the audio signal.

The Tait T805 Quasi-Synchronous system implements the transmit frequency matching using the T801 Frequency Reference Module. The amplitude, absolute and group delay equalisation is carried out using the T805 Audio Signal Processing (ASP) cards.

This following explanation covers the operation of the Tait T805 Quasi-Synchronous system using the T805 ASP cards. As the operation of the T801 is connected only with the transmitters used in the Quasi-Synchronous system, it is not covered in this manual. For further information on the T801, refer to service manual M801-00.

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2.2 The Tait T805 Quasi-Synchronous System

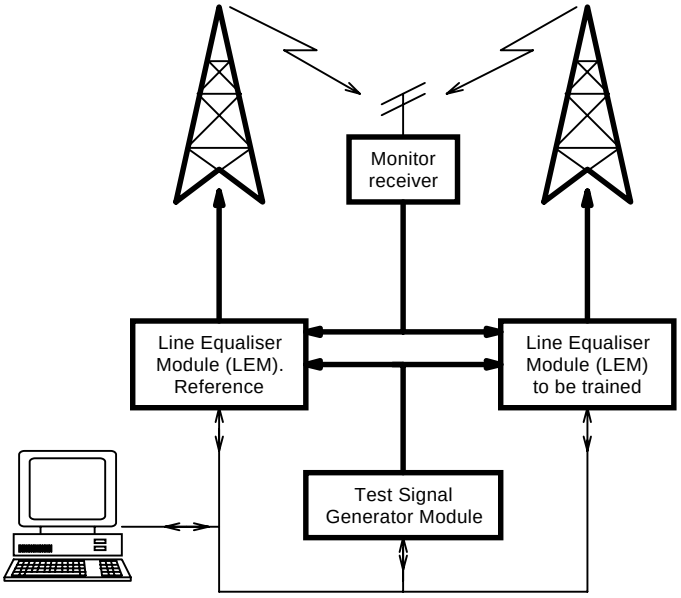

Figure 2.1 Basic Quasi-Synchronous System Block Diagram

Figure 2.1 shows a conceptual Quasi-Synchronous system comprising two transmitters, with each transmitter being fed an audio signal from a common source.

The system cannot operate in the Quasi-Synchronous mode until an audio equalisation process for each transmission path has taken place. The process of setting the "equalisation parameters" is automatic, and is called "training". This procedure is controlled by the system controller.

Monitor receivers are used to measure system performance during equaliser adjustment. The ideal position for a monitor receiver is in the centre of the overlap areas. It is unlikely that this will be possible in most practical situations however, and so it is necessary to compensate for the actual position of the monitor receiver relative to the overlap area. This is achieved by adding "distance constants" to the absolute delay setting. These constants are programmed into the System Controller during system configuration and may be changed if adjustment of the system is required.

When training is invoked, an appropriate LEM/transmitter combination is chosen as the reference and another LEM/transmitter combination is chosen to be trained (note that signals from the two transmitters must overlap). A training signal is passed into the reference LEM/transmitter, and a monitor receiver passes the received signal back to the LEM to be trained where it is sampled and stored. This LEM then uses the monitor receiver to sample the output of the training signal from its own transmitter, which it compares against the stored sample. The equaliser parameters for the trained LEM can then be computed.

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Once this process has been completed, another LEM/transmitter combination is selected and the process repeated. Using this method each transmitter's modulation characteristics are compared and then matched to its neighbour. This process continues until all the LEM/transmitter combinations have been "trained". The system is then ready to operate in the Quasi-Synchronous mode.

The order of training is input into the System Controller during installation and is a function of the system layout of transmitters and monitor receivers.

Note: An LEM is connected to only one transmitter but a monitor receiver may be connected to more than one LEM.

During the process of training, the "training audio" passed to the transmitters by the LEMs has unique frequency characteristics. This "training audio" is similar to band limited white noise and is generated by the Test Signal Generator Module (TSGM). When the process of training is complete, "normal" (speech) audio is passed through the TSGM and distributed to the all the LEMs in the system.

Most Quasi-Synchronous systems will not have their transmitters at the same physical location as the LEM or TSGM. Nor will the monitor receivers be on the same site. In this situation the audio may be passed onto the transmitters by a number of means, e.g. land lines (telecom) or a microwave link.

When land lines are used, an additional pair of modules must be added into the system, as shown in Figure 2.2. These modules are called the Audio Inversion Module (AIM) and Audio Recovery Module (ARM) and their function is to compensate for the variations in the characteristics of the land lines and to allow CTCSS or low frequency tones (67-300Hz) to be sent along them (land lines have an acceptable frequency response only between 300Hz and 3kHz). A more detailed description of the AIM and ARMs may be found in Section 4.3.

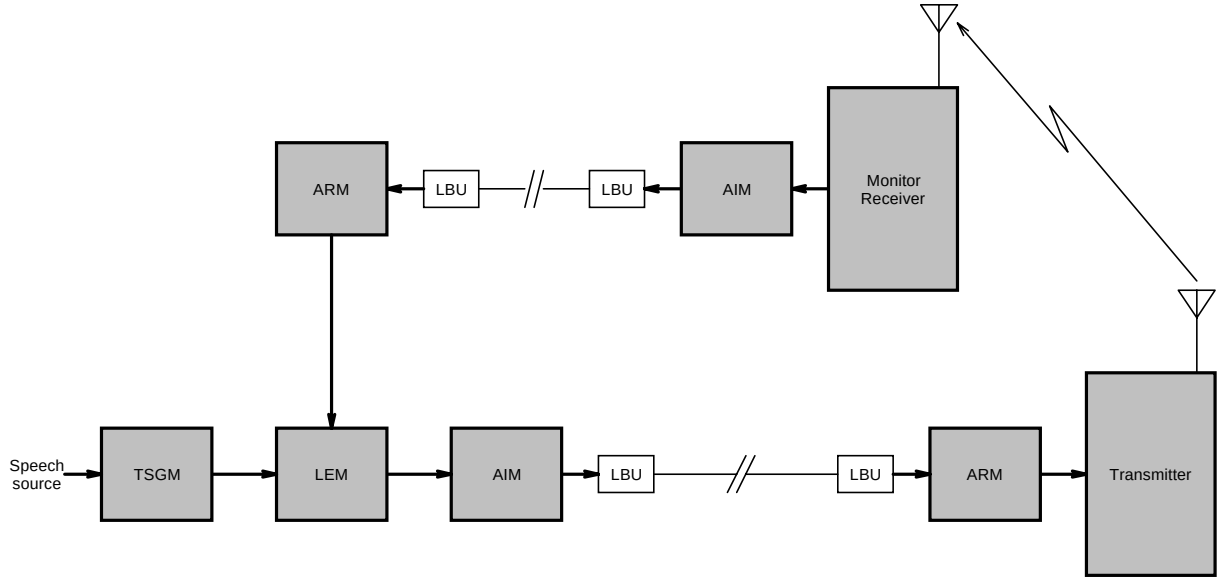

Figure 2.2 Quasi-Synchronous Configuration With AIM/ARM Combination Added

2.3 AIM-ARM Communications Link

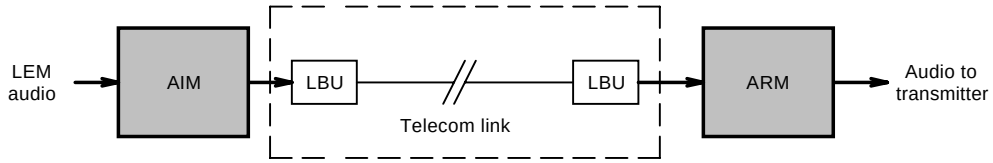

Figure 2.3 AIM-ARM Isolation Via A Line Barrier Unit

When an AIM-ARM combination is used for linking purposes via a Telecom or equivalent line, approved line barrier units must be used to isolate the T805 system (including any AIMs or ARMs) from the Telecom line. Multiple line barrier units are required for multiple AIM-ARM links.

Once connected to a suitable line barrier unit, the T805 system may be connected to a 4-wire Telecom circuit. Figure 2.3 shows the required isolation method in block diagram form.

The T805 system is approved for use only with line barrier units of the CYFAS type 88/0507. BABT approval will be invalidated unless the T805 is used in conjunction with the approved items.

If any other apparatus (including cable or wiring) is to be connected between the line barrier and speech band circuit, that apparatus shall introduce no material effect upon the electrical conditions between the apparatus and the speech band circuit.

Such apparatus shall comprise only approved equipment, cable or wiring complying with a code of practice relevant to installation of equipment covered by BS6328.

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3 Circuit Operation

This section provides a basic description of the circuit operation of the Quasi-Synchronous system and the units that make up the system.

The following topics are covered in this section.

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3.1 Introduction

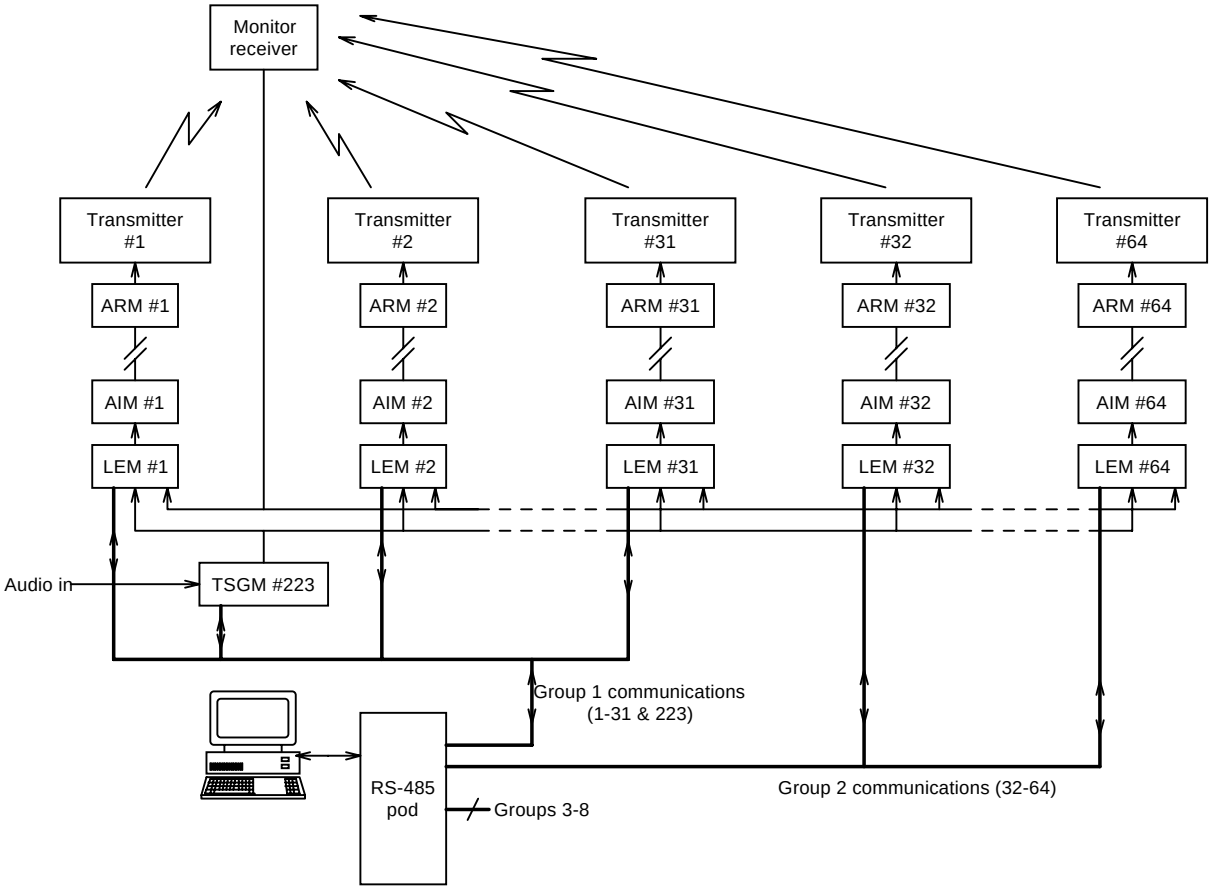

Figure 3.1 Typical T805 Quasi-Synchronous System Block Diagram

Figure 3.1 shows a typical T805 Quasi-Synchronous system configuration. Cards' communications are organised in "groups" of 32. Small systems requiring fewer than 32 combinations of TSGM and LEMs need only one communication group. When more than 32 combinations are required, a second group (up to 64 combinations of TSGM and LEMs) is formed. For 65-96 combinations a third group is used, and so on up to a maximum of 8 groups.

The group structure is used to maintain true RS-485 communications protocol, which allows only 32 combinations of TSGM(s) and LEM(s) to be linked together on the same communications highway.

In the System Controller there is an 8-port RS-485 serial communications board, the ACL II. This (internally) splits up the serial communications and sends commands from the System Controller to the ASP card in the appropriate group.

Figure 3.2 and Figure 3.3 show the two possible types of RS-485 communications links. For more information on the ACL II refer to the System Controller Manual or consult your local Tait dealer or Service Centre.

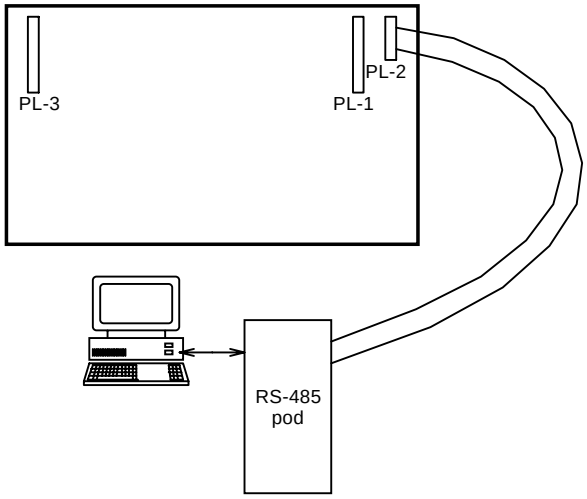

Figure 3.2 RS-485 Communications Link With One Group

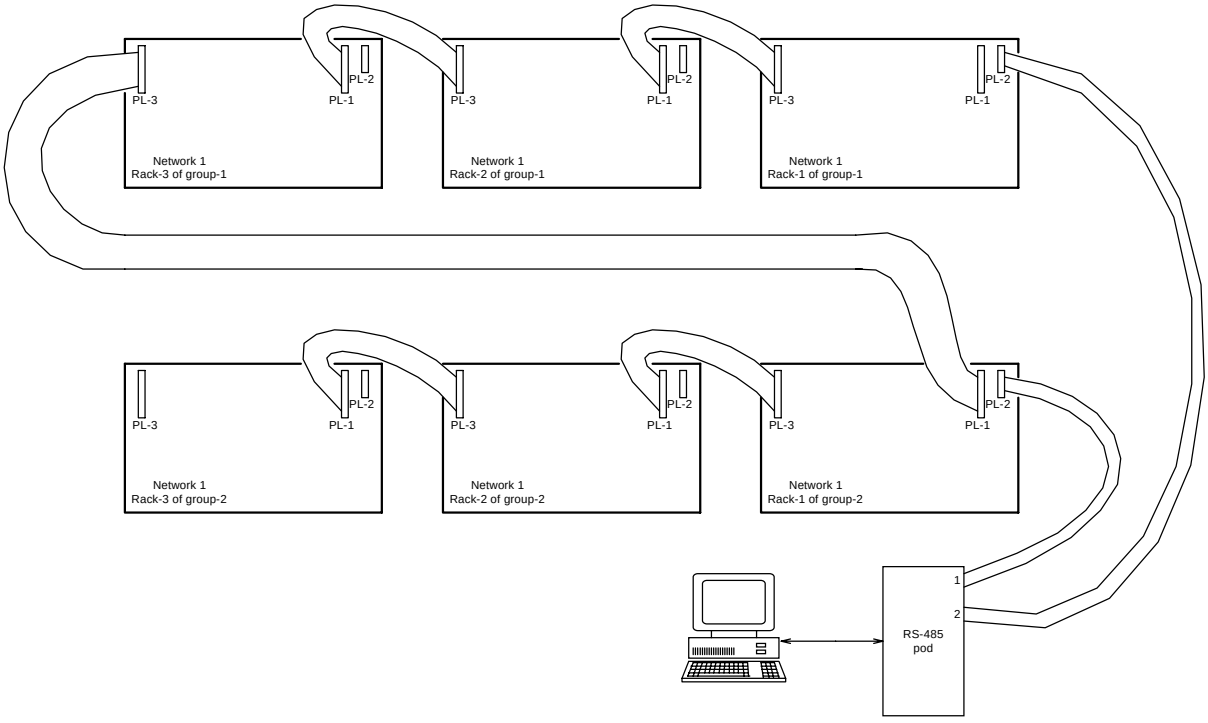

Figure 3.3 RS-485 Communications With A Multi-group Structure

3.2 Quasi-Synchronous System Controller

The Quasi-Synch System controller is an 80386 (or better) IBM[1] compatible computer which configures the system and controls the TSGM or LEM ASP cards during normal operation or training via an RS-485 serial data link. An on-board hard disc contains the M/S Windows[2] based operating software and the configuration information for the system. The operating software is initially loaded via a floppy disc drive.

Communication with the TSGM or LEM cards is by means of an RS-485 link operating at 2400 baud.

The system configuration and other information is loaded into the computer during commissioning, however it may be changed at any time during the operating life of the system. If this does happen, the training process must be repeated.

It is recommended that the training process be carried out at least once a year or whenever the characteristics of the control-base site links are changed.

For more information on the System Controller refer to the System Controller Manual.

1. IBM is a trademark of International Business Machines.
2. M/S Windows is a trademark of the Microsoft Corporation.

3.3 The T805-01 Audio Signal Processing (ASP) Cards

3.3.1 Introduction

The T805 Audio Signal Processing Cards (ASP Cards) are the hardware description for the cards that make up the Quasi-Synchronous system. These cards are software configurable and are selected as either a Test Signal Generator Module (TSGM), Line Equaliser Module (LEM), Audio Inversion Module (AIM) or Audio Recovery Module (ARM).

All these cards have the same hardware and are configured by means of a series of DIP switches which select the appropriate operating software.

The individual circuit blocks which make up the T805 ASP cards are:

- digital signal processor
- analogue interface circuitry
- A/D & D/A converters
- EPROM & RAM memory
- digital input & output circuitry
- wait state generator
- serial communications circuitry
- watchdog timer
- reset circuitry
- power supplies.

The configuration of the circuit blocks may be seen on a functional level in the fold-out at the end of this section (Figure 3.4). Reference to this block diagram and the circuit diagrams (located at the back of this manual) will help with understanding the following description.

3.3.2 The DSP Processor

The heart of the ASP card is the Digital Signal Processing (DSP) IC (IC105), a Texas Instruments TMS320C26 DSP. This IC is similar to a microprocessor but it is optimised for performing mathematical and digital filtering functions.

The TMS320C26 has 1.5k of 16 bit internal RAM and operates with a 40MHz oscillator (IC106). The 16 bit address bus is capable of individually addressing either program memory, data memory or I/O space and has a single serial I/O port.

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3.3.3 Reset Circuitry

When the ASP card is powered up, the RC time constant of R133 and C132 generates a pulse which resets the 4060 counter (IC107). This counter in turn generates reset pulses for the DSP, audio interface ICs (AICs) and the RS-485 serial communications IC (IC302).

The RC pulse also resets a 555 timer which, after a hold off period of approximately 5 seconds, resets a "watchdog reset indicator latch" (IC120). This latch provides both a visual indication ("WDR" LED) and a signal input into the DSP if a watchdog reset has occurred.

The 4060 counter (IC107) also provides the watchdog timer facility if an untrappable processor error occurs. A reset is generated every 500ms after the failure occurs.

A supervisory IC (IC108) will reset the ASP card if the 5V supply falls below 4.8V.

3.3.4 Analogue Interface Circuitry

Balanced audio may be fed into any number or combination of inputs (inputs 1-4), depending on the function of the card. The signals into inputs 3 and 4 are summed (IC205) to form a single signal. This and any other signals are then passed into level shifting op-amps (ICs 201, 203 and 205) which feed them into the A/D convertors. The input impedance of input 3 is link selectable and depends on the function of the card.

Outputs from the D/A convertors are passed to the output amplifiers (ICs 202 and 204) which provide amplification and buffering of the signal before it is fed into the system. Electronic relays (ICs 316, 317) at both outputs isolate the appropriate signals from the rest of the system should the card fail.

As for the inputs, all outputs are balanced to provide noise immunity from any external interfering sources.

3.3.5 A/D and D/A Circuitry

The A/D and D/A conversions are performed by the Audio Interface Circuit ICs (AICs, ICs 210 and 211). The AICs contain switched capacitor anti-alias and reconstruction filtering, sample and hold circuitry, u-law compression/expansion circuits and 14 bit A/D and D/A convertors.

The "digital audio" is passed from Audio Interface Circuits (AICs) to the DSP via the DSP's serial port, where it is processed and passed back to the AICs for outputting to the system.

Because there is only one serial port on the DSP, the AICs' digital inputs and outputs have to be multiplexed. This is achieved via the tri-state buffers (IC209) and the NAND gates (IC206). The DSP knows with which AIC it is communicating by monitoring the signal "X1" from a flip flop (IC208) which generates a logic "1" every time AIC-1 (IC210) sends or receives data. The "X1" signal is read in the DSP's I/O space.

With two AICs linked to the DSP, the reset of one has to be delayed so that they don't try to communicate at the same time. AIC-2's (IC211) reset is delayed 38.5µsec by the combination of ICs 212, 208, 207 126 and 206, the actual time delay being defined by the 74HC4020 counter, IC212.

3.3.6 EPROM & RAM, Wait State Generator

The operating software for the T805 ASP cards is stored in 2 external EPROMs (IC115,117). Battery backed up RAMs (ICs 111, 113) provide non-volatile storage for system data.

The program and data address spaces are partitioned into blocks which are decoded by the miscellaneous logic gates of ICs 121 and 122.

The speed of the data bus (10MHz) is too fast for the EPROMs and RAMs, so the DSP must be slowed down while it is accessing either memory. This is done by generating wait states with a wait state generator (ICs 109, 110, 121 and 125). Both the EPROMs and RAMs have 120nsec access times and require 1 wait state (i.e. an extra bus cycle).

To speed up the system operation, blocks of the T805 ASP operating software are read into the DSP's internal RAM which requires no wait states.

Because of the relatively slow speed at which the outputs of the EPROMs and RAMs switch to a tri-state condition, tri-state buffers (ICs 112, 114, 116 and 118) have been added between them and the data bus to prevent bus contention.

3.3.7 Digital Input And Output

In addition to program and data address space, the DSP has an I/O address space which is utilised to provide digital I/O.

The input is a 16 bit DIP switch (SW301, D0-D7 and SW302, D8-D15) which configures the operating modes of the card (TSGM, LEM, AIM, ARM or test mode). When the card is defined as a TSGM, it sets the internal CTCSS frequency if required. Refer to Section 7 for further information on the DIP switch settings.

One of the 16 bits (D7) is not actually controlled by the DIP switch; it is used as an indicator to the DSP signifying which AIC is operating on its serial communications port. Labelled "X1", see Section 3.3.5 for more information on its operation.

The digital outputs are used for four functions:

- to control the LEDs which signify the operating mode of the card;
- to control the relays connected to the analogue I/O;
- to act as override control for the RS-485 external serial communications transmitter (IC311);
- to reset a latch (IC307) which is under the control of the watchdog circuitry.

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If a fault occurs and the DSP fails, the watchdog uses a latch to disable the analogue audio outputs via the relays and to tri-state the RS-485 transmitter so that any spurious signals from the card do not corrupt the system.

3.3.8 Other Digital I/O

External digital I/O consists of a general output used to control connections to the system. Labelled "DIGOUT", it is an open collector output controlled from the DSP's I/O space (IC306, refer to Section 7).

Two external digital inputs are connected to the DSP's interrupt lines. Labelled "GPS" and "ICCS", they connect to INT-0 and INT-1 respectively. Refer to Section 5 for detailed information on their use.

3.3.9 External Serial Communications

When external serial communications between the system controller and the ASP card are required, a UART (IC302) mapped into the DSP's I/O space is used. A reference oscillator (X301, IC314) generates its clock signal.

For outgoing transmissions the output of the UART is fed into an RS-485 transceiver (IC315) and onto the RS-485 communications bus. The transmission capability of the IC is controlled by the UART but may be overridden by the DSP (digital I/O control) or a watchdog latch which activates if the ASP card develops a fault.

IC315 acts as a receiver whenever it is not transmitting. The DSP constantly polls the UART for any incoming transmissions and responds to them when appropriate.

3.3.10 Watchdog Timer

IC107 forms a free running R-C oscillator and divider to provide the watchdog timer facility should an untrappable processor error take place. A reset is generated approximately 500msec after the failure occurs.

Should a watchdog reset occur, an LED ("WD LED") is lit by the setting of a latch (IC120). This latch also sets an input into the DSP which may be used to indicate to the system controller that a watchdog reset has occurred (assuming the ASP card has reset properly and can respond to polls from the system controller).

If the watchdog reset is successful and the ASP card has recovered, the watchdog latch may be reset via a command from the system controller after it has read the status of the card. This reset is in the form of a pulse from the RTS line of the UART (IC302), passed via D115 to the reset line of the watchdog latch.

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3.3.11 Power Supplies

A 13.8V (nominal) supply provides current for the 5V, 8V and -5V regulators as well as the analogue amplifiers (ICs 202 and 204).

Current consumption for the card is approximately 500mA with the majority of current being required for the +5V supply.

A switched mode regulator (IC101, L103 & D103) converts the 13.8V supply to +5V for all the digital circuitry. The RC combination of R152 and C163 delays the power-up of this regulator for approximately 500ms when the 13.8V is first applied.

Two MAX 635 invertors (IC103 and IC104) provide a -5V supply for the Audio Interface ICs (IC210, IC211). These invertors require a stable input voltage and so are fed by an 8V regulator (IC102). Their maximum current rating restricts them to supplying only 1 AIC each, hence the need for two.

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3.4 The T805-04 Backplane

3.4.1 Introduction

The Tait Quasi-Synchronous system is a modular product and may be housed in one or more 6U high 483mm rack frames. Each card frame has a backplane PCB and slots for either an LEM, TSGM, AIM or ARM. When the physical capacity of a card frame has been exceeded, an additional card frame may be easily added until the maximum number of ports is fitted. The system is capable of operating with either one or two TSGMs per network and up to 222 LEMs. Up to 8 networks may be supported per T805 Quasi-Synchronous system (as long as the total number of LEMs does not exceed 222). The number of AIMs and ARMs is dependent on the system organisation.

When there is a need to remotely locate an AIM or ARM, the T805-04 may be replaced by a 1U rack. Refer to Section 3.5.

3.4.2 Operational Description

The backplane serves a number of functions in the T805 Quasi-Synchronous system:

- to distribute power to the ASP cards;
- to provide a means of audio input to and output from the ASP cards;
- to distribute this audio to other ASP cards and pass it onto other T805-04 backplanes in the T805 Quasi-Synchronous system (if required);
- to provide a means of control signal input to and output from the ASP cards;
- to distribute these control signals to other ASP cards and pass them onto other T805-04 backplanes in the T805 Quasi-Synchronous system (if required);
- to distribute the RS-485 communications to the ASP cards and pass them on to other T805-04 backplanes in the same group.

A detailed description of the above functions is given in Section 10.

3.4.3 Audio Buffers

Balanced high and low frequency training audio/speech will be either fed into the T805-04 backplane via connector PL-1, or passed from a TSGM fitted in the backplane. It is then buffered (IC2 and IC3) and the balanced audio is passed to an output connector (PL3) for linking to the next T805-04 backplane (if required).

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3.4.4 Control Signal Buffers

A control signal (SG+/SG-) may be fed into the T805-04 backplane using RS-485 format via connector PL-1, where it is converted to a digital signal (via the RS-485 transceiver, IC4) and distributed to the RS-485 cards.

Alternatively, it is generated by a TSGM fitted to the backplane and distributed accordingly. The signal will then be converted to RS-485 format (IC5) and fed out via PL-3 to another backplane (if required).

3.4.5 Power Supplies

A nominal supply voltage of +13.8V is fed into the T805-04 backplane via CN10 and the protection circuitry, FUSE1 and D13. It is then passed to a switch (SW1) fitted on the front panel which distributes power to the ASP cards and to two 5V regulators, an 8V regulator and a -5V regulator. Power on indication is via an LED (LED1) fitted to the front panel of the rack.

One of the 5V regulators (REG1) supplies +5V to the digital circuitry located on the backplane. The other 5V regulator (REG2) supplies the positive voltage to the audio circuitry (ICs 1, 2 & 3) located on the backplane.

The 8V regulator (REG3) feeds a regulated voltage to a MAX635 invertor (IC7) which generates -5V for the negative supply of the audio circuitry on the backplane (ICs 1,2, & 3).

3.4.6 Front Panel Switches

The front panel of each rack contains the power switch (SW1), power on indicator (LED1) and a set of nine switches (SW2-SW10), each with an indicator LED (D3-D11).

These switches are connected to the corresponding ICCS input line of each card position in the rack frame. If the ASP card is defined as an AIM, keying its corresponding switch places it in invert mode independent of the presence of the 2900Hz key tone (refer to Section 4.3.1). If the ASP card is defined as an LEM, keying its corresponding switch results in it being "broken out" of Quasi-Synchronous operation (refer to Section 5 for more information on breakout operation).

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3.5 The T805-06 1U Backplane

When an AIM-ARM combination is utilised, there is no need to use a T805-04 backplane at the remote site since (typically) only one ASP card is required.

The T805-06 is a 1U high unit which can be configured to accommodate either an AIM or ARM at the remote site. It is fitted with connections for a power supply and audio input/output for linking the ASP card with a transmitter (where an ARM is used) or receiver (where an AIM is used). A BABT approved line barrier unit (CYFAS type 88/0507) may also be fitted for connection to the Telecom lines. Note that BABT approval will be invalidated unless the T805-06 is used in conjunction with the approved items for connection to a Telecom line.

If any other apparatus (including cable or wiring) is to be connected between the line barrier and speech band circuit, that apparatus shall introduce no material effect upon the electrical conditions between the apparatus and the speech band circuit.

Such apparatus shall comprise only approved equipment, cable or wiring complying with a code of practice relevant to installation of equipment covered by BS6328.

3.6 Power Supply Requirements

Each rack frame in the system is individually supplied with 13.8V which is controlled by a front panel switch. This allows individual parts of the system to be powered down independently for servicing.

If an AIM-ARM link is used in the T805 Quasi-Synchronous System, the System must meet the approval of the Telecom authorities of the country in which it is to operate.

The T805 System is approved in the UK for use only with the T807 mains power supply (EN41004) and BABT approval (BS6328) will be invalidated if other power supplies are used.

The T805 System Controller computer is supplied by the 230V AC mains. An uninterruptible power supply is recommended if the system is in a remote location.

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3.7 Communications Ports

3.7.1 Quasi-Synchronous System Controller To TSGM And LEM

The link between the Quasi-Synchronous System Controller PC and its TSGM(s) and LEMs is RS-485 at 2400 baud via a 9-way D-range connector. Refer to Section 10 for more information.

3.7.2 AIM/ARM Operating Modes Selection

The AIMs and ARMs do not communicate with the Quasi-Synchronous System Controller. Their state of operation is defined during commissioning and their mode is controlled via signalling from the system to which the Quasi-Synchronous System is connected. Refer to Section 4 for more information.

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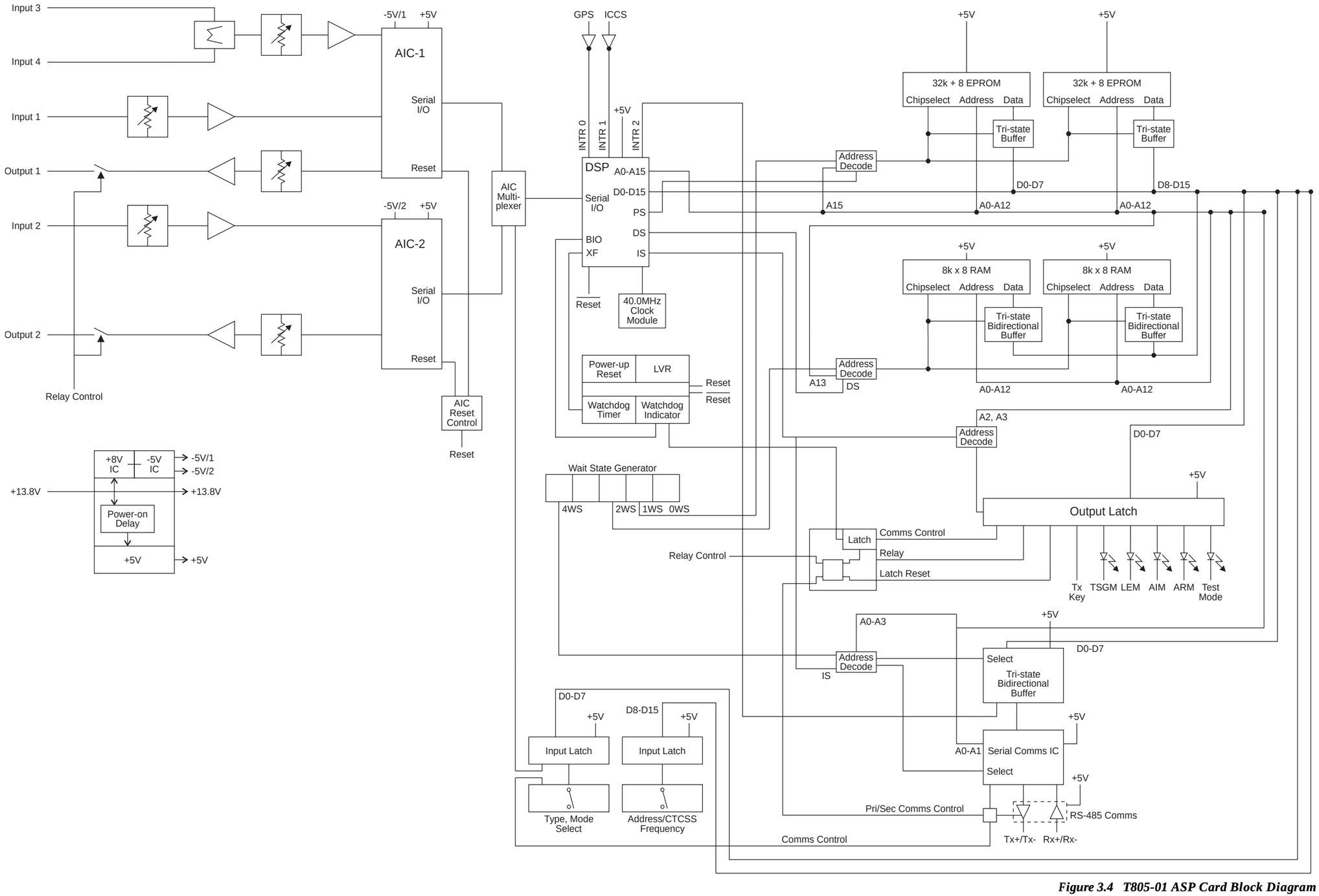

Figure 3.4 T805-01 ASP Card Block Diagram

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4 ASP Card Operation

This section provides a functional description of the T805 Audio Signal Processing (ASP) cards, i.e. TSGM, LEM, AIM and ARM. Each of these cards has the same hardware but different operating software.

The following topics are covered in this section.

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4.1 T805-03 Test Signal Generator Module (TSGM)

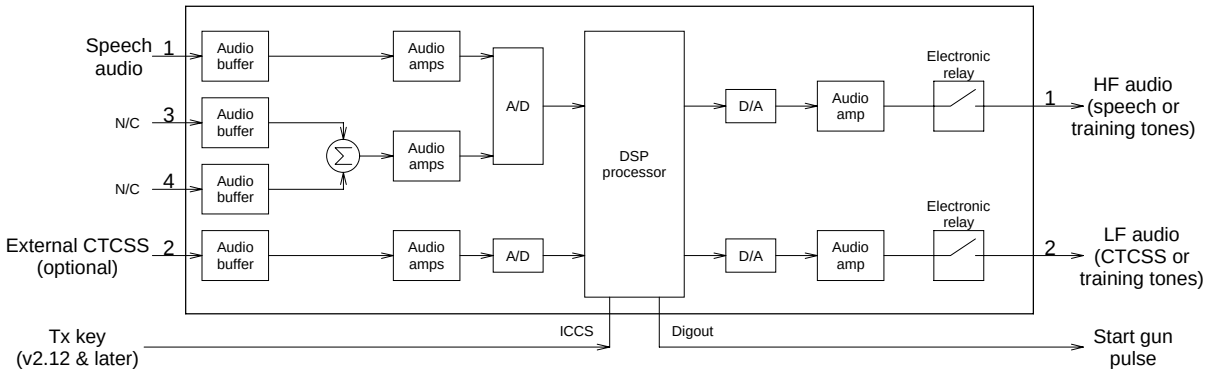

Figure 4.1 TSGM Block Diagram

The TSGM's primary functions are to generate the test tones for the equaliser training process and to distribute audio to the LEMs during normal operation. It can also supply a 2970Hz tone for keying the system transmitters.

The TSGM has two audio inputs:

- the first is for speech from the source;
- the second is for the optional external source of CTCSS tones.

Note: If required, the TSGM may be programmed to internally generate its own CTCSS tone and to optionally generate reverse phase burst CTCSS.

The TSGM has two audio outputs:

- output 1 is used for training tones / speech / key tones in the 300Hz to 3kHz frequency range (HF audio);
- output 2 is used for training tones / CTCSS in the 67 to 300Hz frequency range (LF audio).

In addition there is a digital output called "DIGOUT" which provides the synchronisation pulse or "start gun" required by the LEMs during the training process.

When the system is operating normally in pass mode (i.e. not in the training mode), the TSGM passes the normal speech audio (0-3200Hz for software v2.09, v2.10 & v2.11; 0-2550Hz for v2.12 & v2.13) from the appropriate input (depending on system configuration) to output 1, and after that to all the LEMs. The signal path followed will depend on the system type to which the Quasi-Synchronous system is connected (refer to Section 5). The CTCSS tone (67-300Hz) for the system is sourced from audio output 2 and follows a different path from that of the speech.

All speech audio for the Quasi-Synchronous system is passed through the TSGM. For systems which have the AIM / ARM combinations fitted, two or three methods of keying the transmitters may be used, depending on the software version used:

1. Taking the ICCS input of the TSGM to logic "1" will cause it to generate a keytone of the correct level. This is detected by the AIM, initiating the inversion / recovery process and keying the transmitter connected to the ARM. The tone will continue for as long as the input is at logic "1", and will cease 250ms after the input has fallen to logic "0" (unless reverse phase burst is selected, in which case the tail time is 350ms - see Note 3 below). The ICCS inputs to the AIMs are left unconnected.

Note 1: This method is available with TSGM software v2.12 and later.

2. An externally generated 2970Hz tone at a level of -23dBm may be added to the TSGM audio input. This tone is detected by the AIM, initiating the inversion / recovery process and keying the transmitter connected to the ARM.

Note 2: For TSGM software versions 2.10 and 2.11 this tone can be mixed with the audio fed into input 1. For software versions 2.12 and later this tone is fed separately into input 2.

3. Taking the ICCS input of the AIM to logic "1" will place it in inversion mode and the transmitter will be keyed by the associated ARM, independent of the presence of a 2970Hz tone.

The CTCSS tone from audio output 2 may be generated internally, the frequency being programmed via DIP switches on the board. Alternatively, the CTCSS may be externally supplied, but must be passed into the TSGM via input 2 so that it still exits from audio output 2.

Note 3: For TSGM software versions 2.12 and later internal CTCSS is generated only when the ICCS input is at logic "1", and is stopped when the ICCS input becomes logic "0".

Versions 2.12 and later support reverse phase burst of internal or external CTCSS, where, after a transition from logic "1" to logic "0" of the ICCS input, the output phase of the CTCSS is reversed 180 degrees. Use of reverse phase burst continues CTCSS for 100ms after ICCS falls to logic "0" and continues the 2970Hz keytone for 250ms after cessation of CTCSS. The use of reverse phase burst CTCSS is selectable by DIP switch.

The training sequence is controlled by the System Controller but performed by the TSGM(s) and LEMs. Each time the training of an LEM begins, the TSGM sends out a start gun (synchronisation) pulse via its "DIGOUT" output. This is passed to the "GPS" input of all the LEMs, but only the LEM being trained will respond to it.

There is only one TSGM in a typical network. However, a second one may be added to serve as a back-up if the other fails (if the TSGM fails, all audio is lost as it is routed through the TSGM).

The TSGMs are assigned addresses according to the network to which they are connected (see Table 4.1) and have their RS-485 transceivers permanently enabled for communicating with the System Controller.

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Network Number	TSGM ID Numbers (Decimal)
1	223, 224
2	225, 226
3	227, 228
4	229, 230
5	231, 232
6	233, 234
7	235, 236
8	237, 238

Table 4.1 Assignment Of TSGM IDs According To Network

If the system TSGM fails, the RS-485 transmitter is automatically disabled to prevent corruption of the communications line. The audio I/O is also disabled to prevent interference. Because the failed TSGM is unable to answer polls, the System Controller will then instruct the other TSGM (if fitted) to connect its audio lines and thus become the system TSGM.

For more information on control of the TSGM by the System Controller, refer to the System Controller manual.

4.2 T805-02 Line Equaliser Module (LEM)

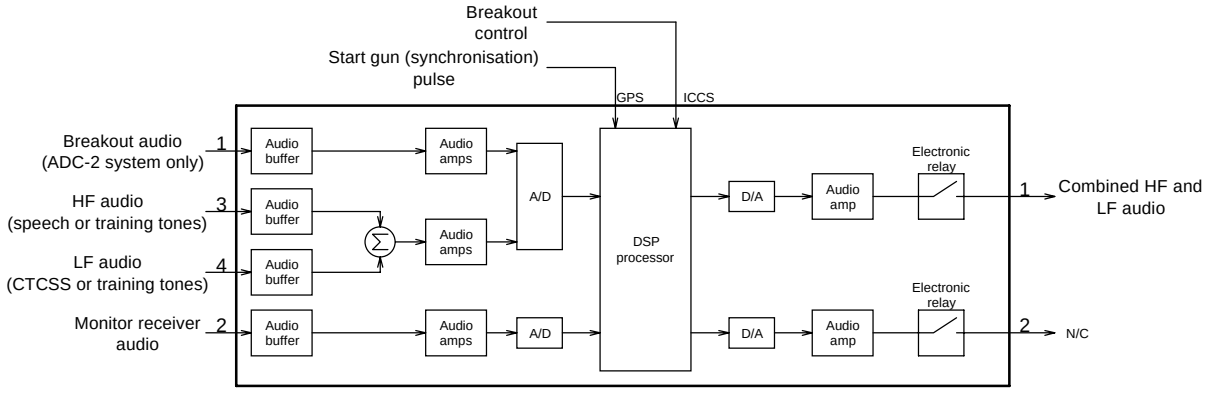

Figure 4.2 LEM Block Diagram

The LEM applies the audio signal equalisation (gain, phase and group delay) for the transmitter to which it is associated. An LEM may be connected to only one transmitter. Like the TSGM, the LEM has two modes of operation: training and normal.

The training procedure for the LEM is controlled by the System Controller. Training audio consisting of high frequency (HF) training audio (300-2550Hz) and low frequency (LF) training audio (45-300Hz) is passed from the TSGM into the LEM to be trained where it is combined, processed and passed to the transmitter. A strategically located monitor receiver passes the received audio back to the LEM where it is compared to the reference tones (from the reference LEM). The characteristics (gain, phase and group delay) are then modified (equalised) by the LEM to produce the same response as the reference. When training of that LEM is complete, the speech audio passed into the LEM is modified according to this characteristic.

The TSGM signals to all LEMs the beginning of each training sequence (which is initiated by the system controller) via the "GPS" input of each LEM. Only the LEM being trained will respond to it.

The audio inputs and outputs of the LEM may be configured in various ways, the system configuration defining how these are selected (refer to Figure 4.2 and Section 5).

Under normal operating conditions the LEMs operate in the Quasi-Synchronous ("equalised") mode, but any LEM may be removed from Quasi-Synchronous operation to operate independently if required ("breakout mode"). Control of this mode is via the "ICCS" input of the appropriate LEM; normally held at logic "0", if pulled to logic "1" (+5V) the LEM may be operated outside the Quasi-Synchronous system (i.e. the audio being passed into the LEM is no longer modified and is usually transmitted on a different frequency). An auxiliary audio input may be used for a different audio path when this mode is invoked. If the training procedure is being carried out at the time the "breakout" occurs, training is aborted. For more information on the training procedures, refer to the System Controller manual.

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4.3 T805-01 Audio Inversion And Recovery Modules (AIM & ARM)

In a typical Quasi-Synchronous system some, if not all, transmitters and monitor receivers will be remotely located from the site containing the TSGMs, LEMs and System Controller. A microwave link or (more typically) land lines may be used to connect the transmitters and monitor receivers with their LEMs. When land lines are used an AIM / ARM combination is required between the LEM and transmitter or the monitor receiver and LEM. The AIM / ARM pair is used because land lines have a satisfactory frequency response only in the 300Hz to 3kHz band; any CTCSS or signalling in the 67-300Hz band will be attenuated and distorted.

Audio, CTCSS and any signalling is passed from the LEM into an AIM where it is processed to adapt the signal for a 300Hz to 3kHz frequency bandwidth and so minimises any possible effects that the link may introduce. It is then passed into the line connecting to the appropriate site.

At this site the signal is passed into an ARM where it is recovered to restore the original signal. If required, the signals are then separated (audio and CTCSS) and fed into the transmitter. Control of the transmitter's key line is via the open collector "DIGOUT" output from its ARM.

4.3.1 T805-01 Audio Inversion Module (AIM)

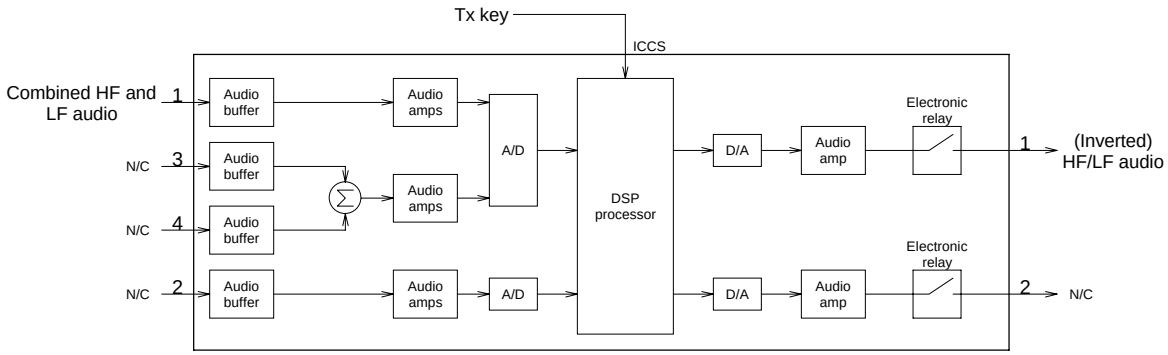

Figure 4.3 AIM Block Diagram

The AIM is operated in either the local or remote mode, although in most applications it will be used in the local mode (i.e. it is at the same location as the TSGM(s), LEMs and system controller).

4.3.1.1 Local Mode

In this mode the AIM has two states of operation: pass and inversion.

(a) Pass Mode

In this mode the AIM is completely transparent. Any audio or signalling (e.g. FSK) input in the 67-2850Hz frequency range is passed straight through to the appropriate output.

(b) Inversion Mode

This is the normal operating mode and is invoked by the user activating the AIM's ICCS input or adding a 2970Hz tone to the speech audio. The speech audio, CTCSS and any signalling tones are shifted from the 67-2550Hz band to a 350-2833Hz band by being mixed with an internally generated 2900Hz carrier (base-band shifting). This allows the equalised audio signal, which includes CTCSS, to be sent along a land line. It also offers immunity to total audio cancellation due to line reversals.

The baseband shifted audio/CTCSS signal and 2900Hz carrier are transmitted down the link to be processed by the ARM.

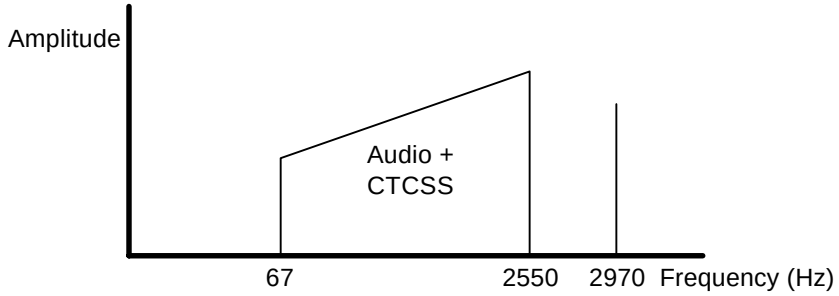

Figure 4.4 Example Of Signals Fed Into An AIM

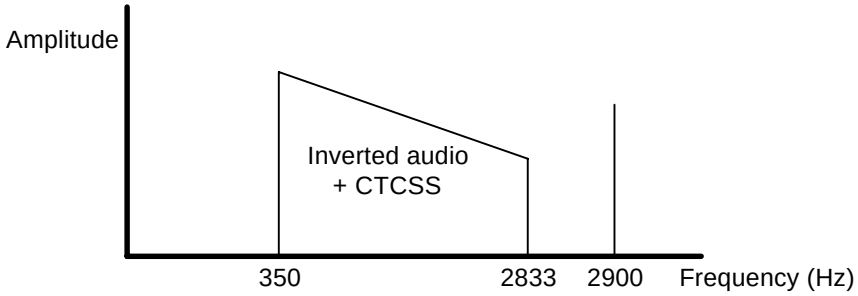

Figure 4.5 Example Of Inverted Signals Output From An AIM

4.3.1.2 Remote Mode

In this mode the AIM is in the inversion mode all the time.

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4.3.2 T805-01 Audio Recovery Module (ARM)

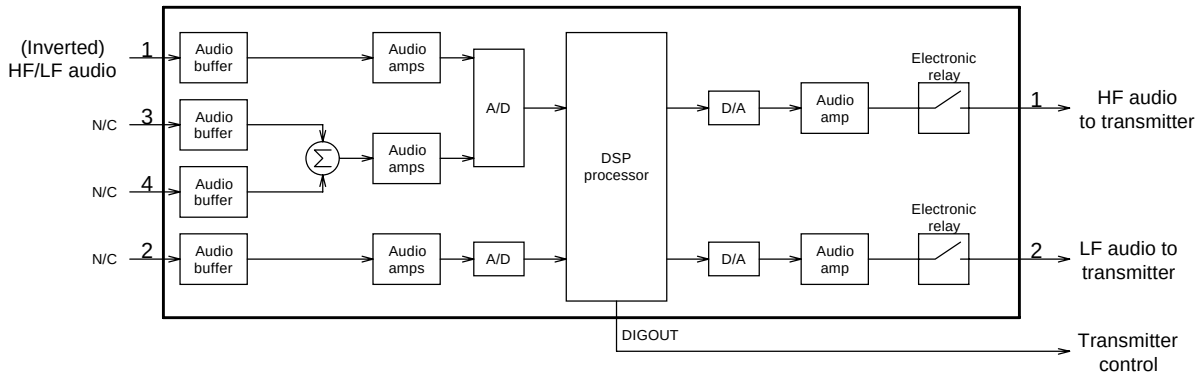

Figure 4.6 ARM Block Diagram

As with the AIM, the ARM operates in either the local or remote mode, although in most applications it operates in the remote mode (remotely located from the TSGM(s), LEMs and system controller).

4.3.2.1 Remote Mode

In this mode the ARM has two states of operation: pass and recovery.

(a) Pass Mode

As for the AIM, in this mode the ARM is completely transparent to any audio in the 67-2850Hz range. Any audio input is passed straight through to the appropriate output.

(b) Recovery Mode

The presence of a 2900Hz key tone at the input places the ARM in the recovery mode and it uses this 2900Hz carrier to recover the original audio by demodulation. The inverted speech + CTCSS (and signalling if used) is shifted down to the nominal bands of 67-300Hz for CTCSS and 300-2550Hz for the speech / signalling.

DIP switches D5 and D6 are used to configure the outputs. D5 determines whether or not a 2970Hz key tone is present in the speech audio output, and D6 determines if the CTCSS is present in the speech audio or has its own separate output.

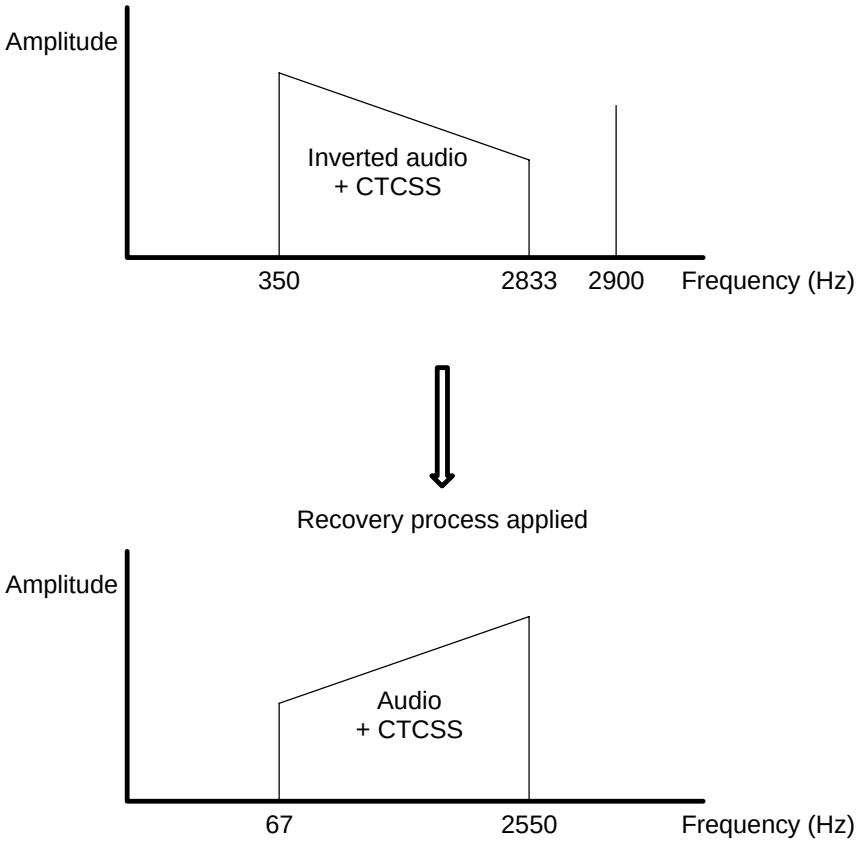

Figure 4.7 ARM Operation When In Remote Recovery Mode

4.3.2.2 Local Mode

In this mode the ARM is in the recovery mode permanently.

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5 Quasi-Synchronous Operation With Audio Distribution Networks (ADNs)

The basic operating principles of the Tait Quasi-Synchronous system were covered in Section 2. However, a Quasi-Synchronous system is not entirely a stand alone system and must be integrated with an "Audio Distribution Network" (ADN) which provides the audio for the Quasi-Synchronous system to transmit.

The Tait Quasi-Synchronous system may be operated with a number of different types of audio distribution network and this section describes how it may be configured to operate with two such ADNs.

Note: The ADN which connects to the T805 Quasi-Synchronous System must meet the approvals of the country in which it is installed. In the UK the standards that must be met are the British Telecom standards EN41003 and BS6328.

Failure to comply with these and any other relevant standards will invalidate the approvals.

This following topics are covered in this section.

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5.1 Operation With Audio Distribution Network Type 1

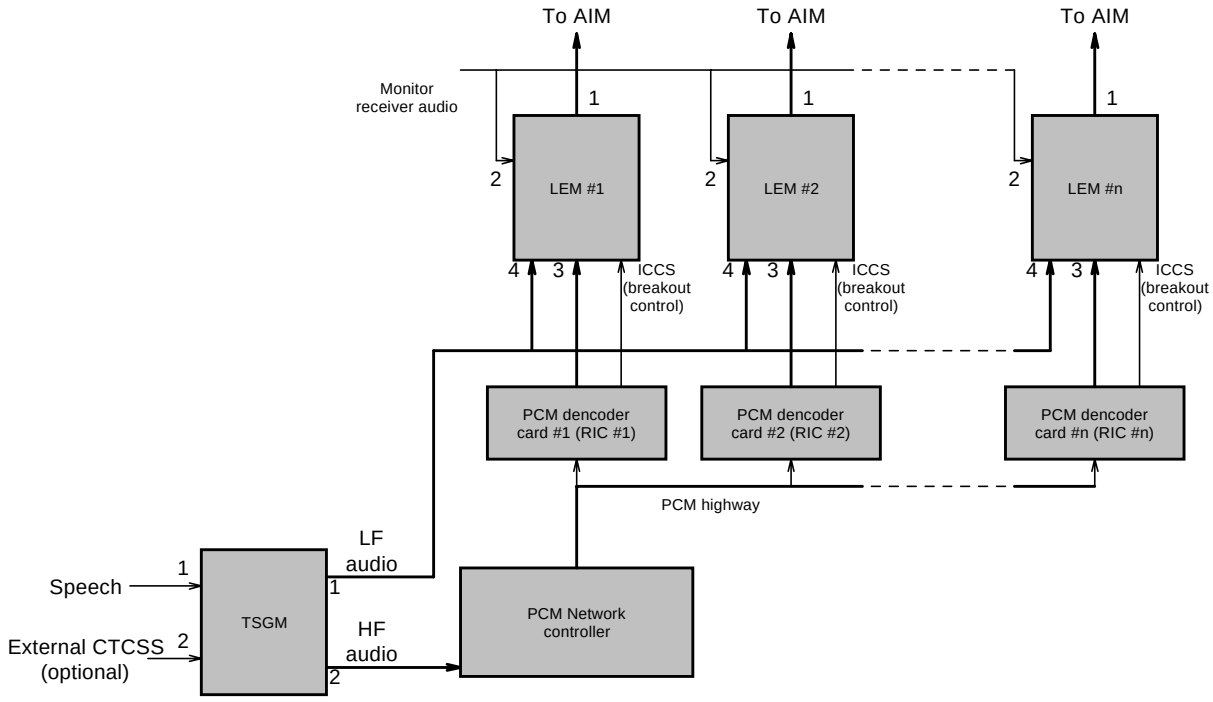

Figure 5.1 Block Diagram Of Audio Distribution Network Type 1

The Audio Distribution Configuration 1 (ADC-1) system is one of the networks currently available that is designed to operate with a Quasi-Synchronous system. Figure 5.1 shows how the T805 Quasi-Synchronous system is integrated into the ADC-1 system.

Speech (HF) audio from the ADC-1 system is passed into the TSGM where, under normal operation, an internal switching arrangement passes it to the appropriate output port. This output is then passed into the facility port of the ADC-1 digital switch controller where it is digitised and passed on to all the RICs (PCM digital to analogue dencoder cards) in the Quasi-Synchronous system. The RICs then convert the PCM code back to an analogue signal. The audio output of the RIC is then passed into its corresponding LEM.

Because of limitations in PCM technology, the RIC's frequency response is limited to the 300Hz to 3kHz band and so CTCSS (or training signals below 300Hz) cannot be passed to the LEMs via this path. The CTCSS is either generated in the TSGM itself or fed into it from an external source. The TSGM's LF output is fed directly into all the LEMs in the Quasi-Synchronous system via an analogue path where it is internally summed with the HF audio and processed/equalised. The combined speech/CTCSS output is then fed directly into the LEMs' AIM.

If there is a requirement to remove a site from the Quasi-Synchronous system (breakout mode) and have it operate independently, a logic output (labelled ICCS) from the RIC

which feeds into its LEM changes state (from logic 0 to logic 1), allowing independent audio to be fed into the LEM. Note that, in order to key the inversion process for the AIMs, either the AIMs' ICCS input must be active or the 2970Hz key tone must be present in the audio.

Training is controlled by the System Controller. In training mode, the training signal is split into two bands: 300Hz to 3kHz (HF training audio) and 45-300Hz (LF training audio). The HF training audio is passed into the ADC-1 system along the same path as normal speech audio, while the LF training audio follows the same path as the CTCSS signal. They are summed in the LEM as for normal operation and then passed out to the transmitter for the training process. Training is carried out using the same process as described in Section 2.

Beyond the LEM the organisation of the Quasi-Synchronous System is independent of the network type being used. The organisation of that part of the system is described in Section 2.

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5.2 Operation With Audio Distribution Network Type 2

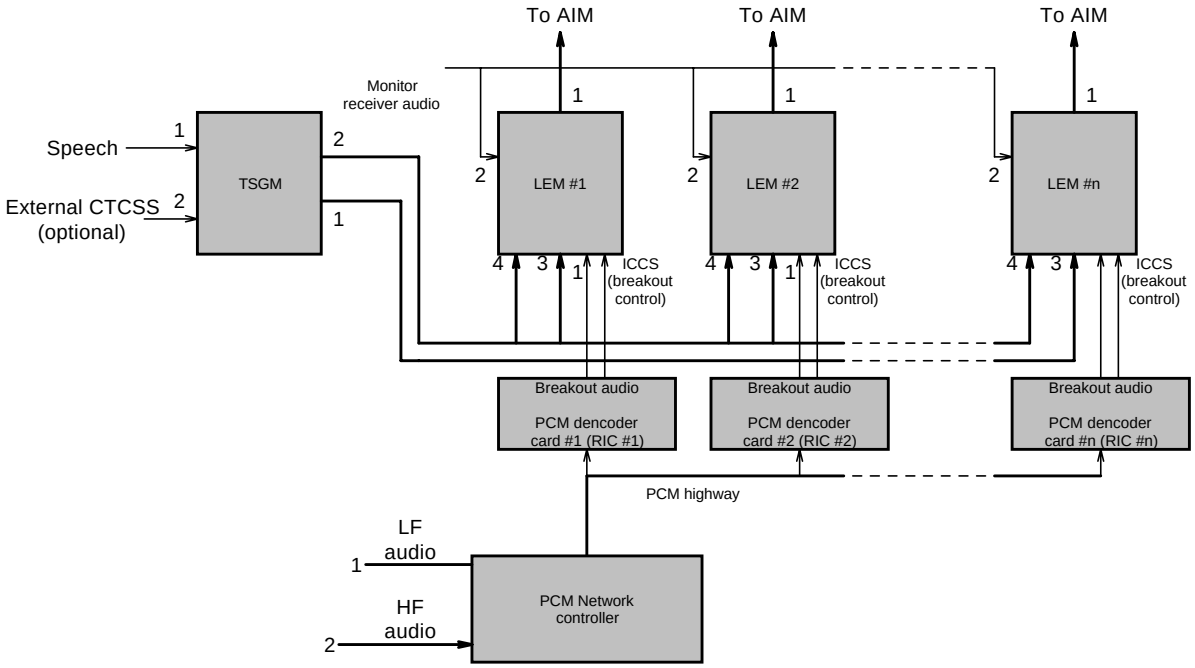

Figure 5.2 Block Diagram Of Audio Distribution Network Type 2

The Audio Distribution Configuration 2 (ADC-2) system is another network currently available which is designed to operate with a Quasi-Synchronous system. Figure 5.2 shows how the Quasi-Synchronous system is integrated into the ADC-2 system.

PCM technology is also used in this network, however in this case there is a uniquely assigned RIC supplying the Quasi-Synchronous audio to the TSGM. From the TSGM the separate HF and LF audio are passed directly to the LEMs. As for the ADC-1 configuration, the CTCSS is supplied either externally (to the TSGM) or is internally generated in the TSGM.

All the LEMs are connected to their own RIC via a second audio input. If there is a requirement for a site to be removed from the system (breakout mode), the ICCS input to the LEM will change state from logic "0" to logic "1". An internal switching arrangement passes the RIC audio through the LEM to its output. Note that the CTCSS is not present in the signal and that to key the AIM's inversion mode, either the AIM's ICCS input must be active or the 2970Hz key tone must be present in the breakout audio.

Training is controlled by the System Controller. As for the ADC-1 system, the training audio is split into two bands: 300Hz to 3kHz band (HF training audio) and 45-300Hz (LF training audio). The HF training audio is passed into the LEMs via the HF audio input and the LF training audio via the LF input. They are then internally summed and passed out to the transmitter via the AIM for the training process (as described in Sec-

tion 2). As for the ADC-1 system arrangement, beyond the LEMs the rest of the Quasi-Synchronous system is independent of the distribution network to which it is connected.

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6 Introduction To Servicing

This section provides some general and advisory information on servicing procedures.

The following topics are covered in this section.

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6.1 General

If further information is required about the T805 or this Manual, it may be obtained from Tait Electronics Ltd or accredited agents. When requesting this information, please quote the equipment type number (e.g. T805-01) and serial number. In the case of the Service Manual quote the Tait Internal Part Number (IPN), e.g. M805-06-100, and for circuit diagrams quote the 'Title', 'IPN' and 'Issue'.

6.1.1 Caution: CMOS Devices

This equipment contains CMOS Devices which are susceptible to damage from static charges. Care when handling these devices is essential. For correct handling procedures refer to the manufacturers' data books, e.g. Philips data books covering CMOS devices, or Motorola CMOS data books, Section 5 'Handling', etc.

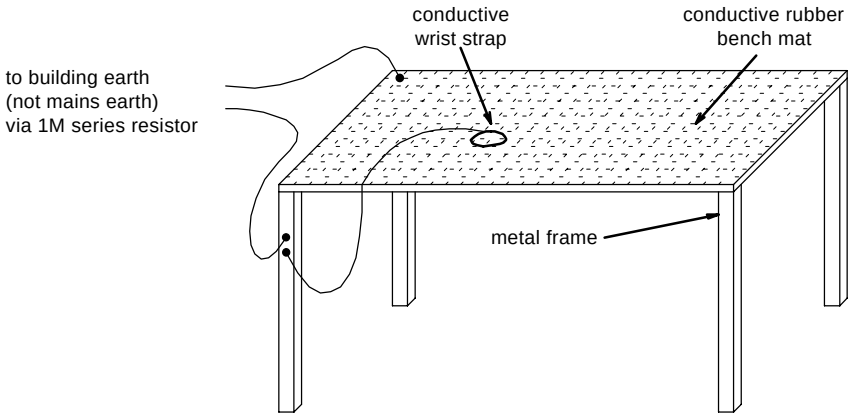

Figure 6.1 Typical Anti-static Bench Set-up

An anti-static bench kit (refer to Figure 6.1) is available from Tait Electronics Ltd under the usual consumable goods ordering system. The kit is held in stock under IPN 937-00000-34 and contains:

1 conductive rubber bench mat
1 earth lead to connect the mat to ground (c/w 1M series resistor)
1 wrist strap
information leaflet.

6.2 Mechanical

6.2.1 Pozidriv Recess Head Screws

Pozidriv recess head screws are the preferred standard on all Tait manufactured equipment. The very real advantages of this type of screw will not be realised unless the correct screwdrivers are used by servicing personnel.

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6.3 Component Replacement

6.3.1 Leaded Components

Whenever components are removed from or fitted to the PCB, care must be taken to avoid damage to the track. The two satisfactory methods of removing components from PTH PCBs are detailed below.

Note: The first method requires the use of a desoldering station, e.g. Philips SBC 314 or Pace MBT-100E.

6.3.1.1 Desoldering Iron Method

Place the tip over the lead and, as the solder starts to melt, move the tip in a circular motion.

Start the suction and continue the movement until 3 or 4 circles have been completed.

Remove the tip while continuing suction to ensure that all solder is removed from the joint, then stop the suction.

Before pulling the lead out, ensure it is not stuck to the plating.

If the lead is still not free, resolder the joint and try again.

Note: The desoldering iron does not usually have enough heat to desolder leads from the ground plane. Additional heat may be applied by holding a soldering iron on the tip of the desoldering iron (this may require some additional help).

6.3.1.2 Component Cutting Method

Cut the leads on the component side of the PCB.

Heat the solder joint ***sufficiently*** to allow ***easy*** removal of the lead by drawing it out from the component side: do ***not*** use undue force.

Fill the hole with solder and then clear with solderwick.

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6.3.2 Surface Mount Devices

Caution: **Surface mount devices (SMD's) require special storage, handling, removal and replacement techniques. This equipment should be serviced only by an approved Tait Dealer or Service Centre equipped with the necessary facilities. Repairs attempted with incorrect equipment or by untrained personnel may result in permanent damage. If in doubt, contact Tait Electronics Ltd or your nearest Tait Branch or Subsidiary.**

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6.4 Technical Instructions

From time to time 'Technical Instructions' (TIs) are issued by Tait Electronics Engineering Division. These TIs may be used to update equipment or information, or to meet specific operational requirements.

Printed below is a list of TIs applicable to T805 equipment. You may wish to file a copy of each TI in this Section for your own reference.

TI No.	Title	Date Of Issue

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7 Initial Programming & Adjustment

The following section describes the adjustment procedure for the T805 Audio Signal Processing cards, the linking arrangements for the T805-04 backplane PCB, the linking arrangement for the T805-06 1U rack and the installation procedure for the T805-10 Quasi-Synchronous System Controller operating software.

The following topics are covered in this section.

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7.1 T805 ASP Cards

7.1.1 Introduction

The initial adjustment procedure consists of defining the card type via DIP switches SW301 & SW302 and setting the audio input and output levels. To simplify the system set-up procedure, all T805 ASP cards (i..e. all TSGMs, LEMs, AIMs and ARMs) have their input sensitivities and output levels set to -10dBm.

Audio is injected into the T805 ASP card via a 600Ω balanced line or a 47kΩ balanced line, depending on the type of card being adjusted (TSGM, LEM, AIM, ARM) and the audio distribution network into which the Quasi-Synchronous System is being integrated.

Note: The following procedure assumes the T805 ASP card is fitted in a T805-04 backplane or a T805-06 1U rack. A T1560-05 rack extension card is recommended for ease of potentiometer adjustment.

7.1.2 DIP Switch Settings

The 16 DIP switches (D0-D7 of SW301 & D8-D15 of SW302) on the ASP card uniquely define what type of card it is and the various operating parameters it needs to operate correctly. These operating parameters are described in Table 7.1 to Table 7.8.

D0	D1	D2	Function
0	0	0	AIM
1	0	0	ARM
0	1	0	LEM
1	1	0	not used
0	0	1	TSGM
1	0	1	test mode 1
0	1	1	test mode 2
1	1	1	test mode 3

Table 7.1 DIP switch settings for switches D0-D2 (SW301) for a T805 ASP card.

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

D3	0 1	local remote	defines whether card is remotely located or not
D4		not used	
D5	0 1	keytone required keytone not required	defines if the 2970Hz keytone is mixed in with the audio output (O / P 1) of an ARM
D6	0 1	CTCSS in O / P 1 CTCSS in O / P 2	applies to the ARM only defines if the LF audio is present in the same output as the HF audio (O / P 1) or is fed to a separate output (O / P 2)
D7		not used	

Table 7.2 DIP switch settings for switches D3-D7 (SW301) for a T805-01 ASP card (AIM or ARM).

D3		not used	
D4	0 1	network 1 network 2	defines the audio distribution network into which the Quasi-Synchronous system is integrated
D5		not used	
D6		not used	
D7		not used	

Table 7.3 DIP switch settings for switches D3-D7 (SW301) for a T805-02 ASP card (LEM).

D3	TSGM address bit 0 (D0)
D4	TSGM address bit 1 (D1)
D5	TSGM address bit 2 (D2)
D6	TSGM address bit 3 (D3)
D7	not used

Table 7.4 DIP switch settings for switches D3-D7 (SW301) for a T805-03 ASP card (TSGM).

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

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LEM Address	D8-D15 (SW302)							
	D8	D9	D10	D11	D12	D13	D14	D15
1	1	0	0	0	0	0	0	0
2	0	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0
4	0	0	1	0	0	0	0	0
..								
..								
..								
219	1	1	0	1	1	0	1	1
220	0	0	1	1	1	0	1	1
221	1	0	1	1	1	0	1	1
222	0	1	1	1	1	0	1	1

Table 7.5 DIP switch settings for switches D8-D15 (SW302) if the ASP card is defined as an LEM. These are used to define the address of the card (1 - 222). Refer to Appendix B for a complete table of settings.

Network	TSGM Address	D3-D6 Of SW302			
		D3	D4	D5	D6
1	223	0	0	0	0
1	224	1	0	0	0
2	225	0	1	0	0
2	226	1	1	0	0
3	227	0	0	1	0
3	228	1	0	1	0
4	229	0	1	1	0
4	230	1	1	1	0
5	231	0	0	0	1
5	232	1	0	0	1
6	233	0	1	0	1
6	234	1	1	0	1
7	235	0	0	1	1
7	236	1	0	1	1
8	237	0	1	1	1
8	238	1	1	1	1

Table 7.6 DIP switch settings for TSGM addresses when the ASP card is defined as a TSGM.

CTCSS Frequency Generated Internally By TSGM (Hz)	D9-D15 (SW302)						
	D9	D10	D11	D12	D13	D14	D15
Externally Supplied CTCSS Used	0	0	0	0	0	0	0
67.0	1	0	0	0	0	0	0
71.9	0	1	0	0	0	0	0
77.0	1	1	0	0	0	0	0
82.5	0	0	1	0	0	0	0
88.5	1	0	1	0	0	0	0
94.8	0	1	1	0	0	0	0
100.0	1	1	1	0	0	0	0
103.5	0	0	0	1	0	0	0
107.2	1	0	0	1	0	0	0
110.9	0	1	0	1	0	0	0
114.8	1	1	0	1	0	0	0
118.8	0	0	1	1	0	0	0
123.0	1	0	1	1	0	0	0
127.3	0	1	1	1	0	0	0
131.8	1	1	1	1	0	0	0
136.5	0	0	0	0	1	0	0
141.3	1	0	0	0	1	0	0
146.2	0	1	0	0	1	0	0
151.4	1	1	0	0	1	0	0
156.7	0	0	1	0	1	0	0
162.2	1	0	1	0	1	0	0
167.9	0	1	1	0	1	0	0
173.8	1	1	1	0	1	0	0
179.9	0	0	0	1	1	0	0
186.2	1	0	0	1	1	0	0
192.8	0	1	0	1	1	0	0
203.5	1	1	0	1	1	0	0
210.7	0	0	1	1	1	0	0
218.1	1	0	1	1	1	0	0
225.7	0	1	1	1	1	0	0
233.6	1	1	1	1	1	0	0
241.8	0	0	0	0	0	1	0
250.3	1	0	0	0	0	1	0

D8	0	CTCSS is being used in the system
	1	CTCSS is not being used in the system

Table 7.7 DIP switch settings for switches D8-D15 (SW302) when the ASP card is defined as a TSGM. (TSGM software v2.11 and earlier)

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CTCSS Frequency Generated Internally By TSGM (Hz)	D9-D14 (SW302)					
	D9	D10	D11	D12	D13	D14
Externally Supplied CTCSS Used	0	0	0	0	0	0
67.0	1	0	0	0	0	0
71.9	0	1	0	0	0	0
74.4	1	1	0	0	0	0
77.0	0	0	1	0	0	0
79.7	1	0	1	0	0	0
82.5	0	1	1	0	0	0
85.4	1	1	1	0	0	0
88.5	0	0	0	1	0	0
91.5	1	0	0	1	0	0
94.8	0	1	0	1	0	0
97.4	1	1	0	1	0	0
100.0	0	0	1	1	0	0
103.5	1	0	1	1	0	0
107.2	0	1	1	1	0	0
110.9	1	1	1	1	0	0
114.8	0	0	0	0	1	0
118.8	1	0	0	0	1	0
123.0	0	1	0	0	1	0
127.3	1	1	0	0	1	0
131.8	0	0	1	0	1	0
136.5	1	0	1	0	1	0
141.3	0	1	1	0	1	0
146.2	1	1	1	0	1	0
151.4	0	0	0	1	1	0
156.7	1	0	0	1	1	0
162.2	0	1	0	1	1	0
167.9	1	1	0	1	1	0
173.8	0	0	1	1	1	0
179.9	1	0	1	1	1	0
186.2	0	1	1	1	1	0
192.8	1	1	1	1	1	0
203.5	0	0	0	0	0	1
210.7	1	0	0	0	0	1
218.1	0	1	0	0	0	1
225.7	1	1	0	0	0	1
233.6	0	0	1	0	0	1
241.8	1	0	1	0	0	1
250.3	0	1	1	0	0	1
259.1	1	1	1	0	0	1

D8	1 0	CTCSS is being used in the system CTCSS is not being used in the system
D15	1 0	CTCSS reverse phase burst enabled CTCSS reverse phase burst disabled

Table 7.8 DIP switch settings for switches D8-D15 (SW302) when the ASP card is defined as a TSGM. (TSGM software v2.12 and later)

7.1.3 TSGM

7.1.3.1 DIP Switch Settings

The following are the settings for switches D0-D15 (SW301 & SW302) if the ASP card is defined as a TSGM. If internal CTCSS is required, refer to Table 7.7 or Table 7.8 for the information on relating the DIP switch setting to the CTCSS frequency.

SW301

0	0	1	*	*	*	*	--
D0	D1	D2	D3	D4	D5	D6	D7

SW302

+	+	+	+	+	+	+	+
D8	D9	D10	D11	D12	D13	D14	D15

* Refer to Table 7.6 for TSGM address setting.
\+ Refer to Table 7.7 or Table 7.8 for CTCSS requirements.
-- Not relevant to card setting.

Note: Depending on the type of switch used:
if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 7.9 DIP switch settings for a TSGM.

7.1.3.2 Audio Links

Short A-B (47kΩ) on link 3. Refer to Figure 7.1.

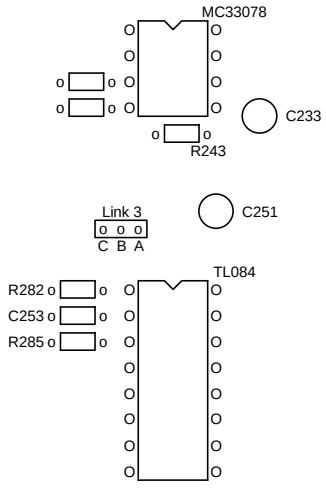

Figure 7.1 Jumper Positions For Link 3 On The ASP Card

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7.1.3.3 Line Levels

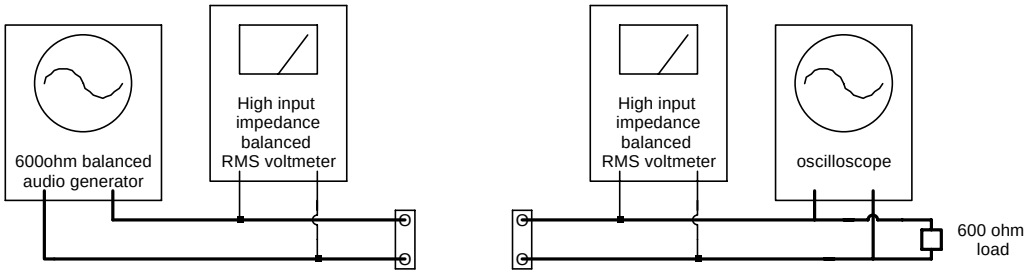

Figure 7.2 Test Equipment Set-up

Connect the test equipment as shown in Figure 7.2.

Note: The signal input connector is the balanced input 1A/X and input 1B/X, where X is the port position of the TSGM card being used (i.e. X = 1 or 2).

If externally supplied CTCSS is required, repeat the tests using input 2A/X and 2B/X.

The signal output connector is output 1A/X and 1B/X or output 2A/X and 2B/X.

Plug the ASP card into the rack extension card (T1560-05) and insert it into the appropriate position in the rack. Use the system controller to set the TSGM to pass mode (if using software v2.12 or earlier).

Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm (600Ω) into "I/P-1" on the T805-04 backplane. If linked correctly, the 600Ω termination is on the backplane.

Monitor pin 24 of IC210 and adjust RV201 to obtain a level of 0dBm. This sets the maximum input level into the A/D converter.

Monitor the balanced signal at "O/P-1" (on the backplane) with an earth isolated audio voltmeter and adjust RV202 for an output level of -10dBm (the 600Ω termination is on the backplane).

If internal CTCSS if being used, enable CTCSS and set the frequency according to the DIP switch settings in Table 7.7 or Table 7.8.

Monitor the balanced signal at "O/P-2" (on the backplane) with an earth isolated audio voltmeter and adjust RV204 for an output level of -13dBm into 600Ω (if the backplane is correctly set up, the 600Ω termination is linked in on the backplane).

If externally supplied CTCSS is being used, inject the appropriate tone into "I/P-2" of the backplane at a level of -13dBm.

Monitor pin 26 of IC211 and adjust RV203 to obtain a level of -3dBm.

Monitor the balanced signal at "O/P-2" with an earth isolated audio voltmeter and adjust RV204 for an output level of -13dBm into 600Ω (which is terminated on the backplane).

7.1.4 LEM

7.1.4.1 DIP Switch Settings

The following are the settings for switches D0-D15 (SW301 & SW302) if the ASP card is defined as an LEM.

SW301

0	1	0	--	*	--	--	--
D0	D1	D2	D3	D4	D5	D6	D7

SW302

+	+	+	+	+	+	+	+
D8	D9	D10	D11	D12	D13	D14	D15

* Refer to Table 7.3 for Network type (ADC-1 or ADC-2).
\+ Refer to Appendix B for LEM address.
-- Not relevant to card setting.

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 7.10 DIP switch settings for an LEM.

7.1.4.2 Audio Links

Refer to Figure 7.1.

ADC-1 system: link B-C of link-3 (600Ω input impedance).

ADC-2 system: link A-B of link-3 (47kΩ input impedance).

7.1.4.3 Line Levels

Connect the test equipment as shown in Figure 7.2.

Plug the ASP card into the T1560-05 rack extension card and insert it into the appropriate position in the rack. Use the system controller to set the LEM to pass mode.

Short 1-2 on links LK3-XA and LK3-XB (where X is the position the ASP card occupies on the rack) and inject a balanced (earth isolated) 1kHz signal at a level of -10dBm into "I/P-3" on the T805-04 backplane.

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Monitor pin 26 of IC210 and adjust RV205 to obtain a level of 0dBm. This sets the maximum input level into the A/D converter.

Monitor the balanced signal at "O/P-1" (on the backplane) with an earth isolated audio voltmeter and adjust RV202 for an output level of -10dBm into 600Ω.

If required, return links LK3-XA & LK3-XB to their original position.

Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm into "I/P-2" on the T805-04 backplane.

Monitor pin 26 of IC211 and adjust RV203 to obtain a level of 0dBm. This sets the maximum input level into the A/D converter.

7.1.5 AIM

7.1.5.1 DIP Switch Settings

The following are the settings for switches D0-D15 (SW301 & SW302) if the ASP card is defined as an AIM.

SW301

0	0	0	*	--	--	--	--
D0	D1	D2	D3	D4	D5	D6	D7

SW302

--	--	--	--	--	--	--	--
D8	D9	D10	D11	D12	D13	D14	D15

* Refer to Table 7.2 for local/remote setting.
-- Not relevant to card setting.

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 7.11 DIP switch settings for an AIM.

7.1.5.2 Audio Links

Short A-B (47k) on link 3. Refer to Figure 7.1.

7.1.5.3 Line Levels

Connect the test equipment as shown in Figure 7.2.

Plug the ASP card into the T1560-05 rack extension card and insert it into the appropriate position in the rack.

Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm (600Ω) into "I/P-1" of the appropriate port on the T805-04 backplane.

Monitor pin 24 of IC210 and adjust RV201 to obtain a level of 0dBm. This sets the maximum input level into the A/D converter.

Monitor the balanced signal at "O/P-1" (on the backplane) with an earth isolated audio voltmeter and adjust RV202 for an output level of -10dBm into 600Ω.

7.1.6 ARM

7.1.6.1 DIP Switch Settings

The following are the settings for switches D0-D15 (SW301 & SW302) if the ASP card is defined as an ARM.

SW301

1	0	0	*	--	+	**	--
D0	D1	D2	D3	D4	D5	D6	D7

SW302

--	--	--	--	--	--	--	--
D8	D9	D10	D11	D12	D13	D14	D15

* Refer to Table 7.2 for local/remote setting.
\+ Refer to Table 7.2 for keytone on/off switch.
** Refer to Table 7.2 for CTCSS output selection.
-- Not relevant to card setting.

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 7.12 DIP switch settings for an ARM.

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7.1.6.2 Audio Links

Short A-B (47k) on link 3. Refer to Figure 7.1.

7.1.6.3 Line Levels

Connect the test equipment as shown in Figure 7.2.

Plug the ASP card into the T1560-05 rack extension card and insert it into the appropriate position in the rack.

Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm (600Ω) into "I/P-1" of the appropriate port on the T805-04 backplane.

Monitor pin 24 of IC210 and adjust RV201 to obtain a level of 0dBm. This sets the maximum input level into the A/D converter.

Monitor the balanced signal at "O/P-1" (on the backplane) with an earth isolated audio voltmeter and adjust RV202 for an output level of -10dBm into 600Ω.

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7.2 T805-04 Backplane Links

Refer to Section 10.

7.3 Transmitter Sensitivity Adjustment

Note: **For the Quasi-Synchronous system to operate within the specified parameters, set the transmitters for a pre-emphasised response and disable all audio compression in the audio processor. Also set up the dual point modulation as per the standard procedure. Refer to the appropriate service manual for more information.**

To properly train the system, the CTCSS input into all the transmitters of the Quasi-Synchronous system *must* be connected, even if CTCSS is not being used.

Inject a balanced 1kHz tone at a level of -12dBm into the audio input of the transmitter.

Adjust the transmitter modulation sensitivity so that a modulation level of 60% of maximum system deviation is achieved.

Remove the 1kHz tone.

Inject a 150Hz tone at a level of -13dBm into the CTCSS input of the transmitter.

Adjust the CTCSS deviation pot. (if fitted) so that a modulation level of 10% of maximum system deviation is achieved. If there is no CTCSS deviation pot. fitted, set the final deviation level within the T805-06 ARM.

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7.4 Monitor Receiver Output Level Adjustment

Note: **The audio processor of the monitor receiver must be linked for a 67Hz to 3kHz de-emphasised frequency response (all high pass filtering should be bypassed). Refer to the appropriate service manual for more information.**

Inject an on-channel RF signal at a level of -47dBm into the monitor receiver.

Adjust the signal generator for a 1kHz audio signal deviated to ±60% of maximum system deviation.

Adjust the line output level to obtain -10dBm into a 600Ω balanced termination.

7.5 Line Barrier Unit Connection

See also Section 1.3, Warnings.

7.5.1 Introduction

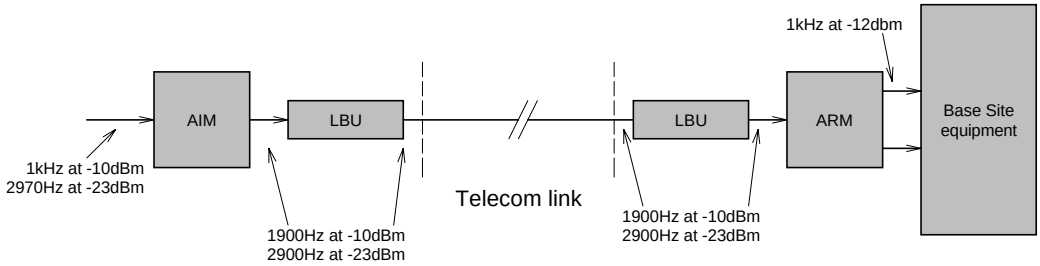

Figure 7.3 AIM/ARM Input And Output Levels

When an AIM / ARM combination is used, both the AIM and ARM must be connected to the Telecom lines via line barrier units.

These line barrier units must be Telecom approved for the country in which the T805 system is operated.

In the UK the T805 system is approved for indirect connection into the Telecom speech band circuits (BS6328). Where signalling is required, a nominal frequency of 2280Hz is used. It requires no signalling in the frequency range 2220Hz to 2340Hz. No signalling below 200Hz is presented to the Telecom network.

The T805, as supplied with line barriers, is suitable for direct connection to speech band circuits or relevant branch systems for speech band circuits. It may be connected to 4W Private Speech Band circuits. It must be used only in conjunction with the protection barrier(s) specified in the instructions for use.

The T805 is also suitable for point to point circuits.

The T805 is BABT approved for use only with the CYFAS 88 / 0507 Line Barrier Units. Approval will be invalidated unless the T805 is used in conjunction with this barrier.

7.5.2 Wiring Between The Line Barrier Unit And The T805 System

Connection to the speech band circuit is from the terminal blocks in the CYFAS Line Barrier Unit (type 88 / 0507), via cable with solid copper conductors of nominal diameter between 0.4mm and 0.6mm. Refer to Section 10 for installation details.

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Note that some methods of connection to the network or circuit are the responsibility of the public telecommunications operator or a person authorised by that operator.

If any other apparatus, including cable or wiring, is to be connected to any speech band circuit, then all that other apparatus shall comply with the following:

(1) The overall transmission characteristics of all that other apparatus shall be such as to introduce no material effect upon the electrical conditions presented to one another by the apparatus and the speech band circuit.

(2) All other apparatus shall comprise only:

(i) Apparatus approved (see note) for the purpose of connection between the T805 and the speech band circuit;

(ii) Cable or wiring complying with a code of practice for the installation of equipment covered by Section 9 of BS6328 or such other requirements as may be applicable.

Figure 7.3 shows the levels that should be presented to the Telecom lines if the system is correctly aligned and a balanced test tone of 1kHz at -10dBm is injected into input 1 of the TSGM.

Note: To key the appropriate transmitter in the system:

either make the ICCS input of the corresponding AIM active;
or sum a 2970Hz key tone at -23dBm into the TSGM's audio input.

No adjustment of the levels into or out of the ASP card should be required if they are set using the methods described in either Sections 7 or 8 (all input and output levels are set for 600Ω terminations).

7.6 Installing T805 Software

To install the operating software for the T805 Quasi-Synchronous System Controller, follow the instructions in the System Controller manual and either power up the PC or push the reset button.

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8 Functional Tests

The following test procedures will confirm that the T805 ASP card has been adjusted correctly and is fully operational.

Refer to Section 9 for fault finding information if required.

The following topics are covered in this section.

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8.1 DC Checks

8.1.1 Power Rails

Using a T1560-05 rack extension card, measure the voltage of the 13.8V (nominal) DC rail at pin 8C of connector PL-1.

Measure the voltage of the 5V rail on pin 20 of IC116 (74F244).

Check the output voltage of the 8V regulator by measuring the voltage at pin 6 of IC103 (MAX635).

Check for short circuits.

8.1.2 Current Consumption

Remove all cards from the rack except the card under test.

Select test mode 3 using the DIP switches on the ASP card (refer to Section 8.2).

Connect the rack to the appropriate power supply.

Monitor the current drawn by the power supply and then remove the card. Check that the decrease in current is no more than 0.9A (typically 0.5A).

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8.2 The ASP Card Test Mode

8.2.1 General

A series of tests has been written into the ASP card software to allow the complete functional testing of the T805 ASP card. These "test modes" (numbered 1, 2 and 3) are selected by setting DIP switches D0, D1 and D2 (SW301) in the appropriate positions on the card under test. The settings of the other DIP switches do not affect the selection or functioning of the test mode.

To enter the test mode:

either disconnect power from the card, set the DIP switches and then reconnect the power;

or set the DIP switches and press the "RESET" button on the front of the ASP card.

Unless otherwise indicated in the test procedure, short A-B of link 3 as shown in Figure 8.1 (47k input impedance).

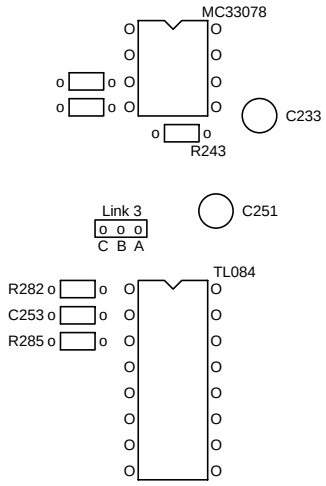

Figure 8.1 Jumper Positions For Link-3 On The ASP Card

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8.2.2 Test Mode 1

8.2.2.1 Introduction

Remove any shorts from LINK 1.

Set the DIP switches (SW301 & SW302) as shown in Table 8.1 (note that only switches D0, D1 and D2 define the test mode).

SW301

1	0	1	--	--	--	--	--
D0	D1	D2	D3	D4	D5	D6	D7

SW302

--	--	--	--	--	--	--	--
D8	D9	D10	D11	D12	D13	D14	D15

-- Not relevant to card setting.

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 8.1 DIP switch settings for placing the ASP card in test mode 1.

Apply power to the ASP card and short LINK 1 after the ASP card has successfully powered up.

The "TEST MODE", "TSGM", "LEM" and "ARM" LEDs should light up (unless otherwise indicated). The operation of the "WDR" LED is random in this test mode and should be ignored.

8.2.2.2 Analogue Audio Circuitry

In this test the electronic relays are in their normal energised state, allowing audio to be passed. A signal is fed into the main input of each audio interface circuit (AIC), digitised and passed into the digital signal processor IC (DSP). It is then passed back into the original AIC, reconverted into an analogue signal and passed into the AIC's main output. The signal path is thus:

the signal from the summing of inputs 3 and 4 is passed to the balanced output of IC202 (O/P-1), and the input 2 signal is passed to the balanced output of IC204 (O/P-2).

- Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm into input 3 (600Ω termination on test lead). Leave input 4 unconnected.

  Monitor the level at TP13 or pin 26 of AIC-1 (IC210) and adjust RV205 for a level of 0dBm (2.2V p-p).

  Monitor the balanced signal at output 1 (or TP14/TP15) when output 1 is terminated into a 600Ω load. Adjust RV202 for a level of -10dBm.

  Sweep the audio band from 100Hz to 10kHz and check the frequency response is flat to within ±0.5dB from 100Hz to 3.6kHz. The response should drop off rapidly above 3.7kHz due to the internal AIC anti-aliasing low pass switched capacitor filter. If this roll-off is not apparent, the AICs are not initialising correctly.

- Remove the signal from input 3 and inject a balanced 1kHz signal at -10dBm into input 4. Verify that the balanced signal at output 1 is -10dBm when terminated into a 600Ω load.

- When the separate testing of inputs 3 and 4 is complete, inject a 1kHz signal into input 3 and a 4.5kHz signal into input 4, each signal at a level of -10dBm (600Ω terminations on test lead).

  Check output 1 and verify that only the 1kHz signal is present at a level of -10dBm into a 600Ω load.

- Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm into input 2 (600Ω terminations on test lead).

  Monitor the level at TP31 or pin 26 of AIC-2 (IC211) and adjust RV203 for a level of 0dBm (2.2V p-p).

  Monitor the balanced signal at output 2 (or TP26/TP27) when output 2 is terminated into a 600Ω load. Adjust RV204 for a level of -10dBm.

  Sweep the audio band from 100Hz to 10kHz and check the frequency response is flat to within ±0.5dB from 100Hz to 3.6kHz. The response should drop off rapidly above 3.7kHz due to the internal AIC anti-aliasing low pass switched capacitor filter. If this roll-off is not apparent, the AICs are not initialising correctly.

8.2.2.3 Serial Communications Transmitter

In test mode 1 the card under test is constantly transmitting the ASCII code for "U" via its RS-485 serial communications port. The RS-485 LED is lit when data is being transmitted.

- **Computer Available**

  Connect the backplane to a computer fitted with RS-485 serial communications and an appropriate software package that allows the sending and receiving of serial data.

  Program the software to receive a data stream at 1200 baud with 8 data bits, no parity and 1 stop bit.

  Check that the received data is a continuous stream of "U"s.

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- **Computer Unavailable**

  Monitor the signal on pin 7 of IC315 (DS3695) with an oscilloscope and check that a 600Hz square wave is present.

8.2.2.4 Watchdog Timer

Check that the reset circuit and watchdog timer has been disabled by a short on LINK 1.

If the "TESTMODE", "TSGM", "LEM" and "ARM" LEDs flash at a rate of approximately 500msec, there is a fault in the watchdog reset circuitry which the linking out does not eliminate.

8.2.2.5 Digital I/O

Connect a 10kΩ pull-up resistor to the "DIGOUT" line (pin 8A of connector PL-1) and connect to +5V.

Verify that it is at logic 0 (0V). The "DIGOUT" LED should also be lit.

Remove the short on LINK 1. The "DIGOUT" LED should flash at a rate of approximately 500ms.

Replace the short on LINK 1.

8.2.2.6 RAM Test

During test mode 1, the DSP IC is writing $AA to each location in the RAM and reading it back to check correct read / write operation. If this test fails, the TSGM LED will be off permanently (until a reset clears it).

Note: **The RAM test overwrites any data stored in the RAMs. If the card is being used as an LEM in an existing system, its coefficients must be downloaded from the System Controller once the functional testing has been completed.**

8.2.3 Test Mode 2

8.2.3.1 Introduction

Remove any shorts from LINK 1.

Set the DIP switches (SW301 & SW302) as shown in Table 8.2 (note that only switches D0, D1 and D2 define the test mode).

Apply power to the ASP card and short LINK 1 after the ASP card has successfully powered up.

The "TEST MODE" LED should light up. All other LEDs should be extinguished (unless otherwise indicated). The operation of the "WDR" LED is random in this test mode and should be ignored.

SW301

0	1	1	--	--	--	--	--
D0	D1	D2	D3	D4	D5	D6	D7

SW302

--	--	--	--	--	--	--	--
D8	D9	D10	D11	D12	D13	D14	D15

-- Not relevant to card setting.

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 8.2 DIP switch settings for placing the ASP card in test mode 2.

8.2.3.2 Audio Interface Circuit

In this test the relays are de-energised, preventing audio output from the AICs reaching the output connector. A signal is fed into the main input of each audio interface circuit (AIC), digitised and passed into the digital signal processor IC (DSP). It is then passed back into the AIC, reconverted into analogue and passed into the AIC's outputs. The signal path is thus:

the signal from the summing of inputs 3 and 4 is passed to the balanced output of IC202, and the input 2 signal is passed to the balanced output of IC204.

Note: If the audio levels have been set up in test mode 1, they do not need to be readjusted as described below.

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- Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm into input 3 (600Ω termination on test lead). Leave input 4 unconnected.

  Monitor the level at TP13 or pin 26 of AIC-1 (IC210) and adjust RV205 for a level of 0dBm (2.2V p-p).

  Monitor the balanced signal at TP16/TP17 with a high impedance voltmeter or oscilloscope and check that the level measures 820mV p-p (290mV rms).

  Verify that the relays are de-energised by checking there is no signal present at the output 1 connector (or TP14/TP15).

- Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm into input 2 (600Ω terminations on test lead).

  Monitor the level at TP31 or pin 26 of AIC-2 (IC211) and adjust RV203 for a level of 0dBm (2.2V p-p).

  Monitor the balanced signal at TP28/TP29 with a high impedance voltmeter or oscilloscope and check that the level measures 820mV p-p (290mV rms).

  Verify that the relays are de-energised by checking there is no signal present at the output 2 connector (or TP26/TP27).

8.2.3.3 Serial Communications Transmitter

In this test the RS-485 transmitter is disabled (verified by the RS-485 LED being extinguished) and the receive mode enabled. If the ASP card is sent the ASCII code for the symbols "AB", the LEM LED will light up for 300ms every time it receives a correctly structured signal.

Connect the backplane to a computer fitted with RS-485 serial communications and an appropriate software package that allows the sending of serial data.

Program the software to transmit a data stream at 1200 baud with 7 data bits, odd parity and 1 stop bit.

Send the "AB" data stream and observe the LEM LED.

Note: If a framing, overrun or parity error occurs, the TSGM LED will light and stay lit until the card is reset or powered down.

8.2.3.4 Reset Circuitry And Watchdog Timer

Enable the watchdog timer by removing the short on "LINK 1" and check that:

- the TSGM and LEM LEDs flash every 500msec.;
- the test mode LED lights and stays lit;
- the "AIM" LED does not light at all.

Note: The status of the ARM LED depends on the setting of the DIP switches (refer to Section 8.2.2.5).

When this test is complete, replace the short on "LINK 1" to disable the watchdog timer.

8.2.3.5 Digital I/O

The following test and the corresponding test in Section 8.2.4.4 verify that all the DIP switches are functioning correctly.

Set the DIP switches (SW301 & SW302) as shown in Table 8.3.

Check that the "ARM" LED lights.

SW301

0	1	1	1	0	1	0	1
D0	D1	D2	D3	D4	D5	D6	D7

SW302

0	1	0	1	0	1	0	1
D8	D9	D10	D11	D12	D13	D14	D15

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 8.3 DIP switch settings for testing the functionality of the DIP switches.

Connect a 10kΩ pull up resistor to the "DIGOUT" line (pin 8A of connector PL-1) and connect to +5V. Verify that it is at logic 1 (5V). The "DIGOUT" LED should be extinguished.

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8.2.4 Test Mode 3

8.2.4.1 Introduction

Remove any shorts from LINK 1.

Set the DIP switches (SW301 & SW302) as shown in Table 8.4 (note that only switches D0, D1 and D2 define the test mode).

Apply power to the ASP card.

The "TEST MODE" LED should light up. All other LEDs should be extinguished. If the "WDR" LED is lit, it can be extinguished by a brief press of the "RESET" button (SW1) on the front of the ASP card.

Note: A brief press of the "RESET" button will reset the "WDR" LED, while a longer press (approx. half a second or longer) will reset the ASP card.

SW301

1	1	1	--	--	--	--	--
D0	D1	D2	D3	D4	D5	D6	D7

SW302

--	--	--	--	--	--	--	--
D8	D9	D10	D11	D12	D13	D14	D15

-- Not relevant to card setting.

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 8.4 DIP switch settings for placing the ASP card in test mode 3.

8.2.4.2 Audio Interface Circuit

In this test the electronic relays are in their normal energised state, allowing audio output to be passed to the connector. A signal is fed into the auxiliary input of the main audio interface circuit (AIC), digitised and passed into the digital signal processor IC (DSP). The DSP then passes the digital signal through a low pass filtering algorithm with a cut frequency of 3kHz. The filtered signal is then passed back into the AIC, reconverted into analogue and passed into the AIC's main output. The signal path is thus:

the signal into input 1 is passed to output 1.

- Inject a balanced (earth isolated) 1kHz signal at a level of -10dBm into input 1 (600Ω termination on test lead).

  Monitor the level at TP22 or pin 24 of AIC-1 (IC210) and adjust RV201 for a level of 0dBm (2.2V p-p).

  Monitor the balanced signal at output 1 (or TP14/TP15) when output 1 is terminated into a 600Ω load. Adjust RV202 for a level of -10dBm.

  Sweep the audio band from 100Hz to 10kHz and observe the frequency response. The action of the 3kHz low pass filter should be evident above 3kHz. If this roll-off is not apparent, the AICs are not initialising correctly.

8.2.4.3 Watchdog Timer

The short on LINK 1 should be removed when entering test mode 3. If all the LEDs except the AIM LED flash, refer to Section 9.4 for fault finding information.

8.2.4.4 Digital I/O

The following test and the corresponding test in Section 8.2.3.5 verify that all the DIP switches are functioning correctly.

Set the DIP switches (SW301 & SW302) as shown in Table 8.5.

Check that the "TSGM" LED lights.

SW301

1	1	1	0	1	0	1	0
D0	D1	D2	D3	D4	D5	D6	D7

SW302

1	0	1	0	1	0	1	0
D8	D9	D10	D11	D12	D13	D14	D15

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Table 8.5 DIP switch settings for testing the functionality of the DIP switches.

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9 Fault Finding

Warning: **Immediately disconnect the equipment if it is physically damaged and arrange for its disposal or repair.**

Note: **Static handling precautions must be followed when servicing any part of the T805 Quasi-Synchronous system.**

The following fault finding flow charts may be used to help locate a hardware problem, however they are by no means a complete fault finding procedure. If the fault still exists after having progressed through them in a logical manner, contact your nearest authorised Tait Dealer or Service Centre. Further assistance may be obtained from the Product Support Group, Tait Electronics Ltd, Christchurch, New Zealand.

The following topics are covered in this section.

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9.1 Visual Checks

Check the cables and connections between the T805-04 racks and the T805-10 Quasi-Synchronous system controller.

Check the links to the modem and dumb terminal (if fitted).

Remove the ASP cards from the rack and inspect for damaged or broken components.

Note: Disconnect power from the rack before removing or inserting the ASP cards.

Check for defective solder joints. If repair or replacement is considered necessary, refer to Section 6.3.

9.2 Component Checks

If an IC is suspected of faulty operation, the most reliable check is to measure the DC operating voltages. Due to the catastrophic nature of most IC failures, the pin voltages will usually be markedly different from the recommended values in the presence of a fault. The recommended values can be obtained from either the Circuit Diagram or the component data catalogue.

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9.3 DC Checks

9.3.1 T805 ASP Cards

Measure the voltage of the 13.8V (nominal) DC rail at pin 1 of IC101 (LM2576).

If no voltage or a low voltage is measured, remove the card under test to verify there is no short on the card causing it to pull down the rail.

If the voltage returns to normal after removing the card, check for shorts or PCB faults.

If the voltage measurement remains abnormal when the card is removed, check the backplane PCB for shorts or PCB faults.

Check the 8V supply by measuring the voltage at pin 6 of IC103 (MAX635).

Check the 5V supply by measuring the voltage at pin 16 of IC109 (74F112).

9.3.2 T805-04 Backplane

Check the 5V digital supply by measuring the voltage at pin 8 of IC4 (DS3695).

Check the 5V analogue supply by measuring the voltage at pin 4 of IC2 (TL084).

Check the 8V supply by measuring the voltage at pin 6 of IC7 (MAX635).

Check the -5V analogue supply by measuring the voltage at pin 1 of IC7 (MAX635).

Check for short circuits.

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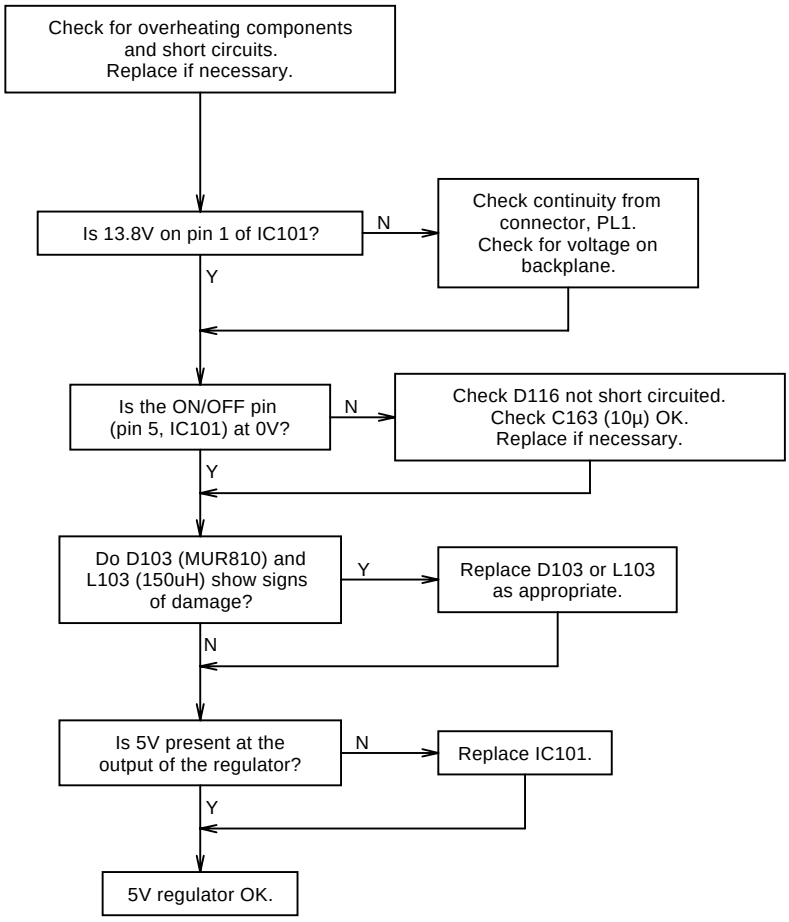
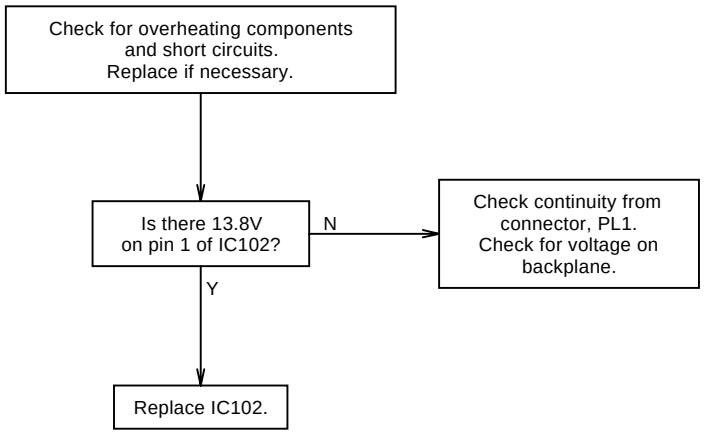
9.4 Fault Finding Charts

9.4.1 T805 5V Regulator



9.4.2 T805 8V Regulator



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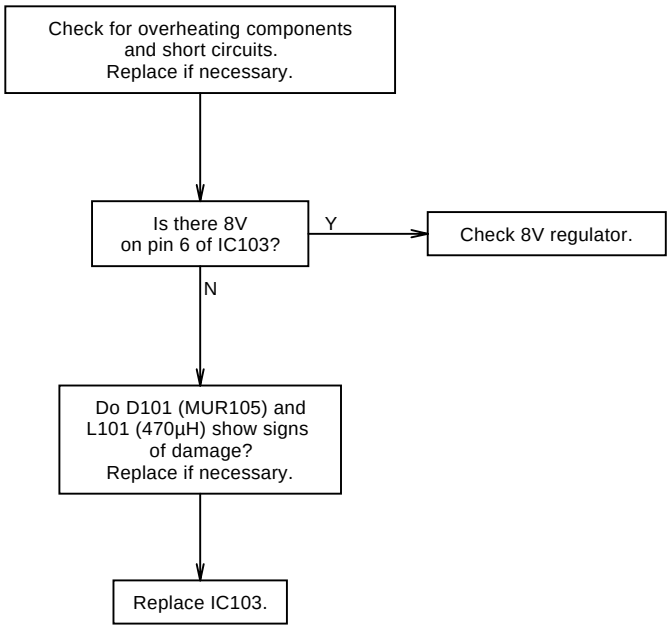
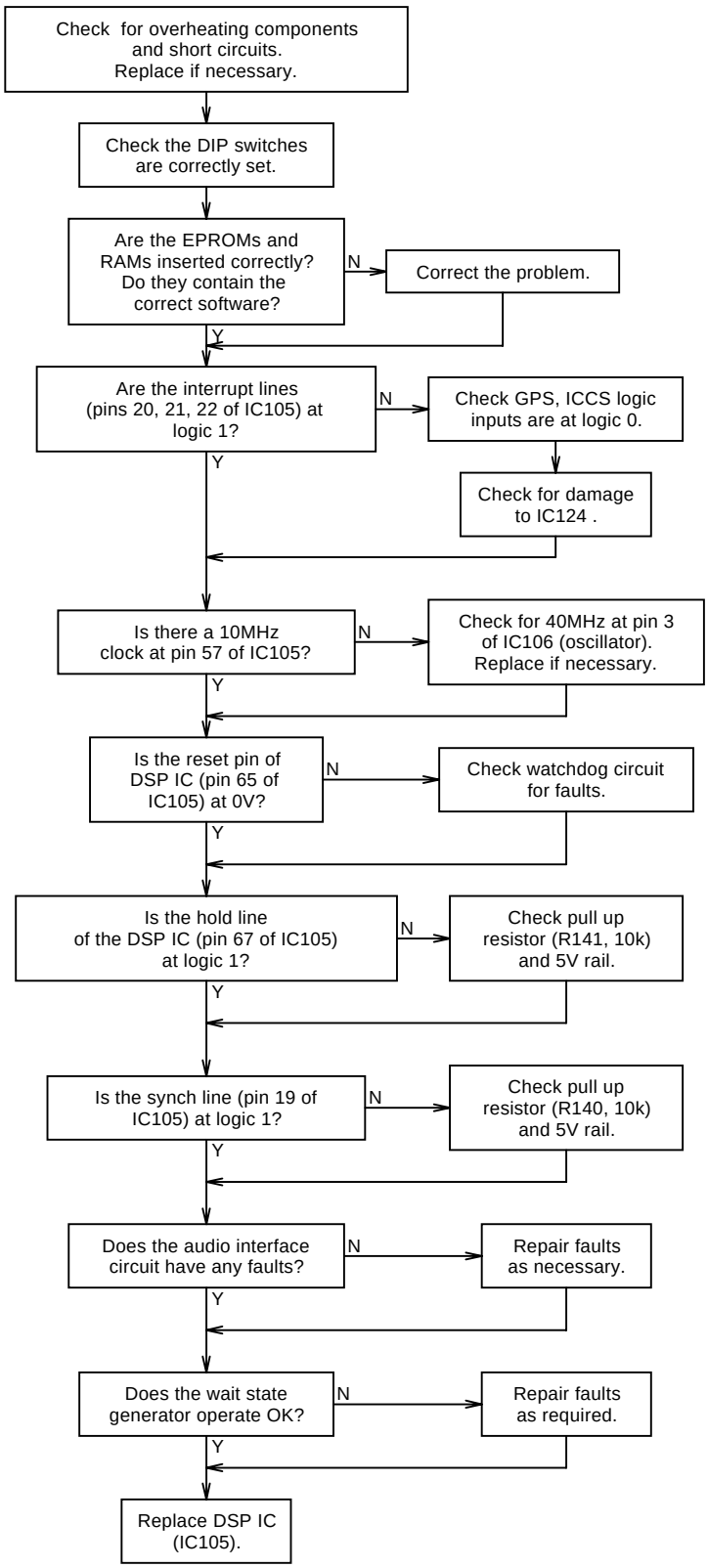
9.4.3 T805 -5V Regulator



9.4.4 T805 Digital Signal Processor Operating Incorrectly



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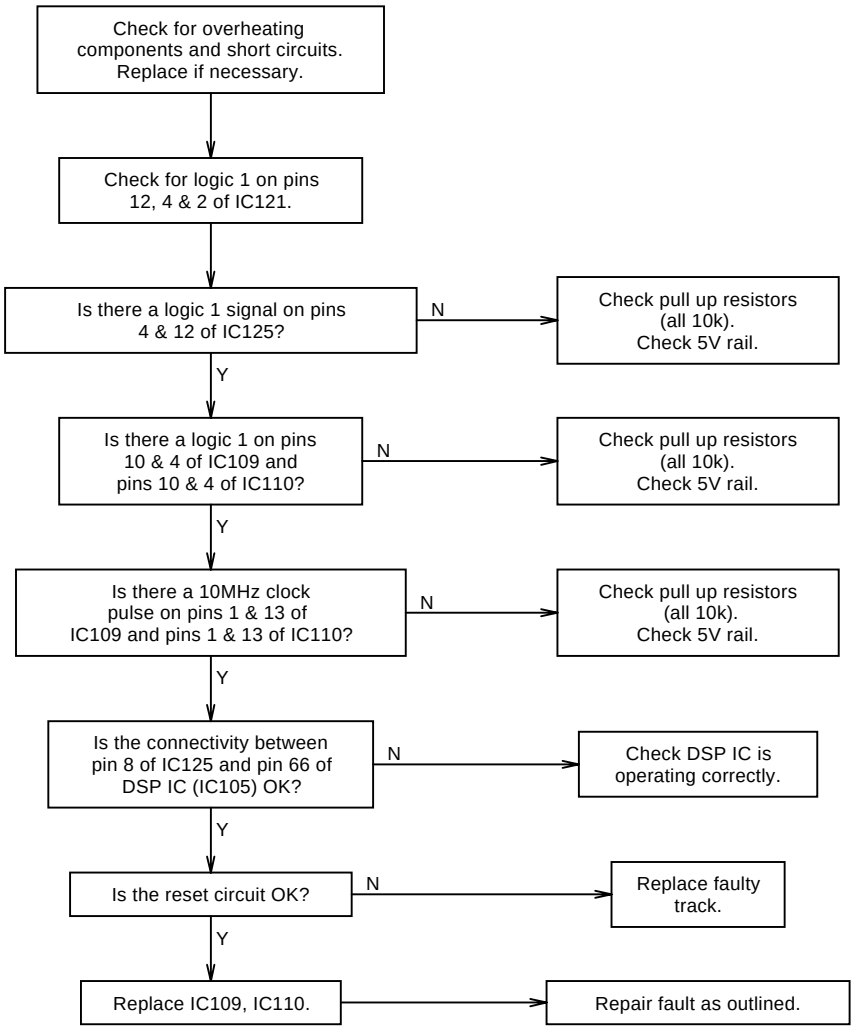
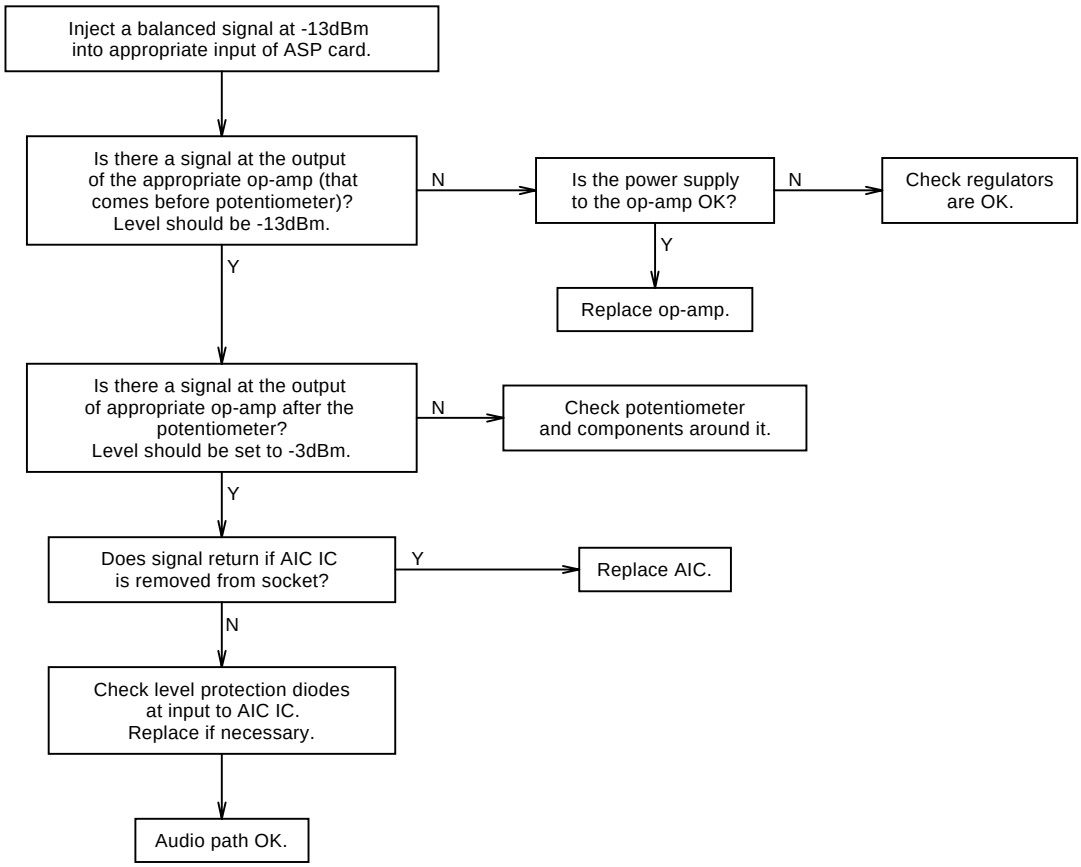
9.4.5 T805 Wait State Generator



9.4.6 T805 Analogue Audio Paths



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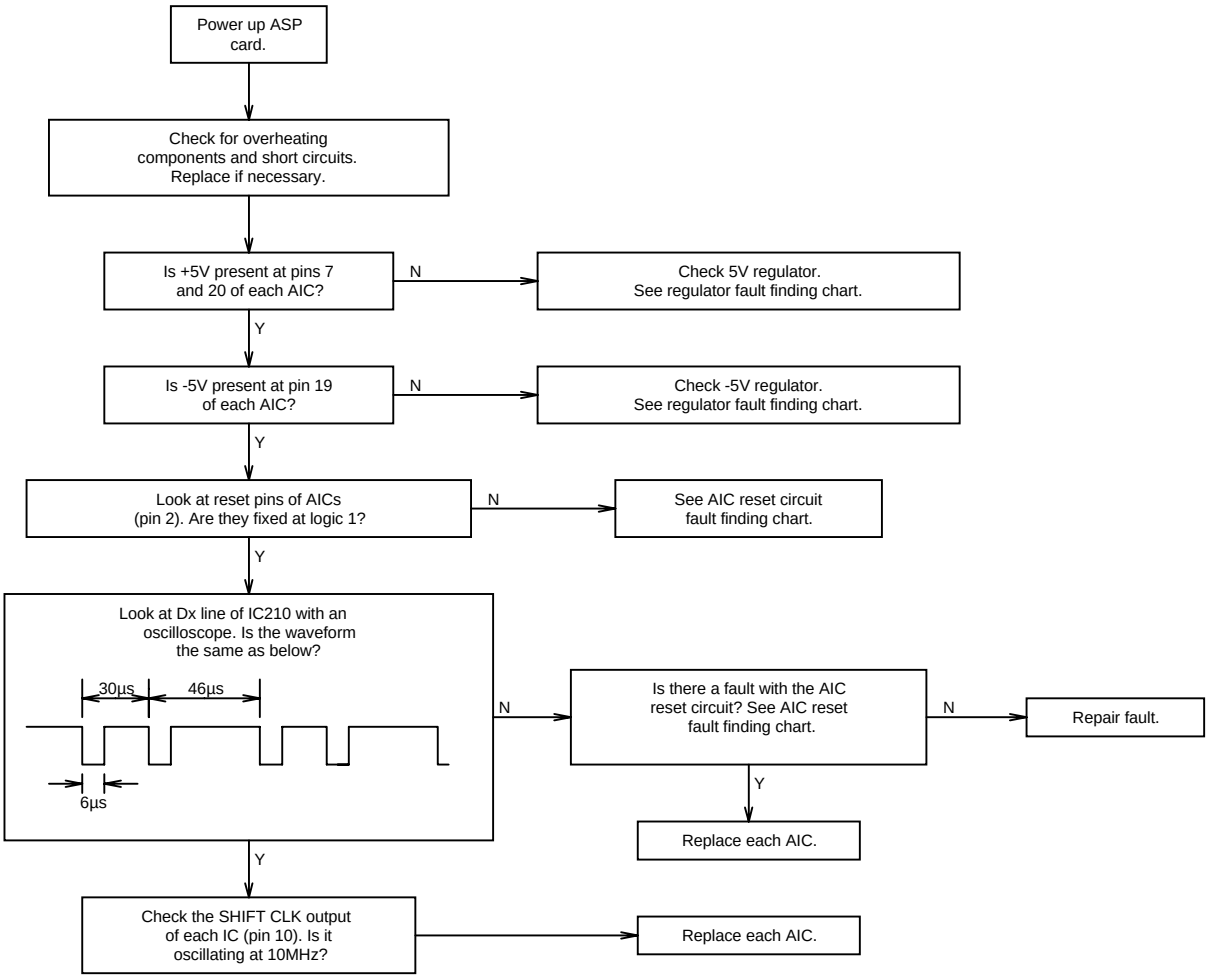
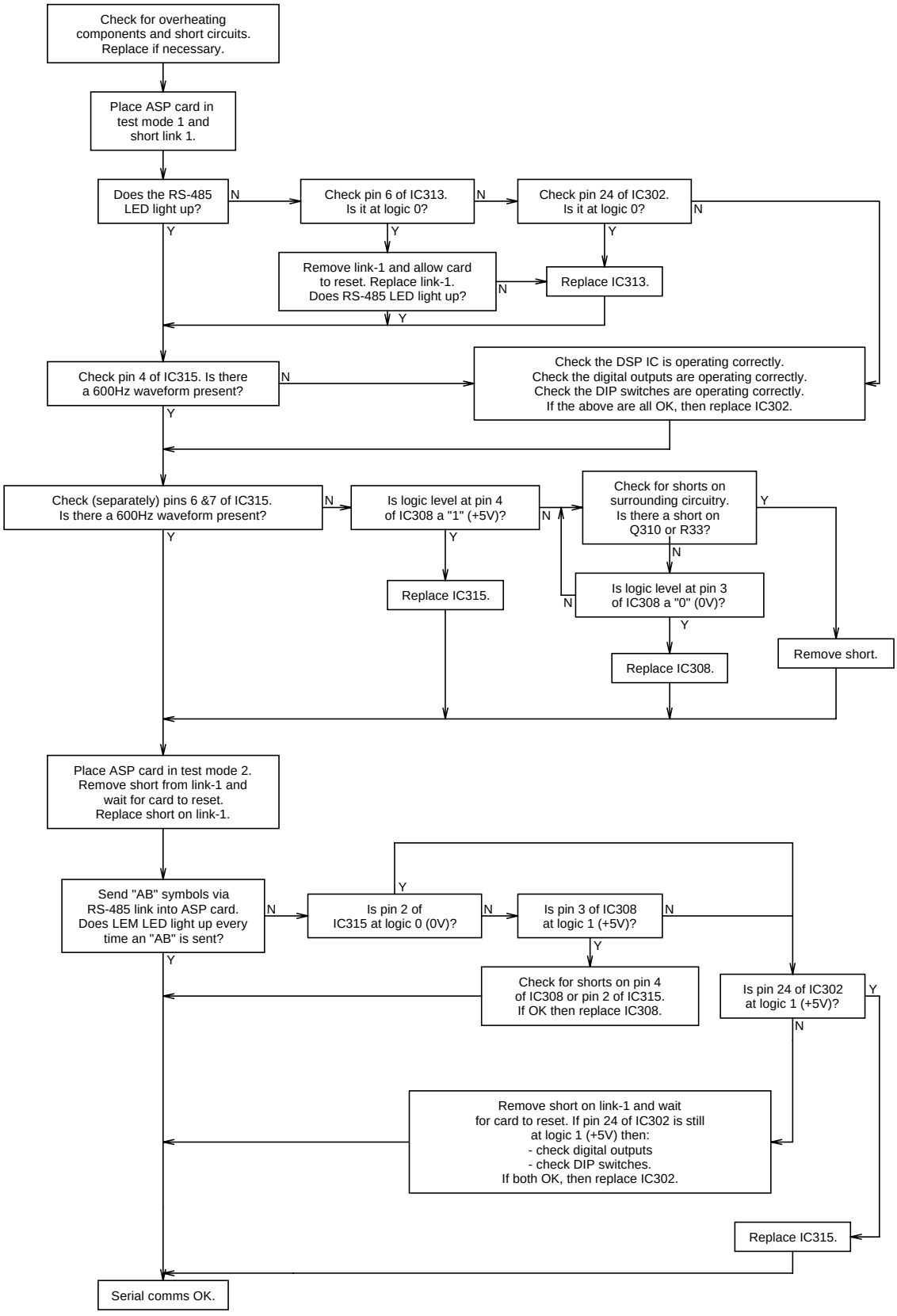
9.4.7 T805 Audio Interface Circuits



9.4.8 T805 Serial (RS-485) Communications



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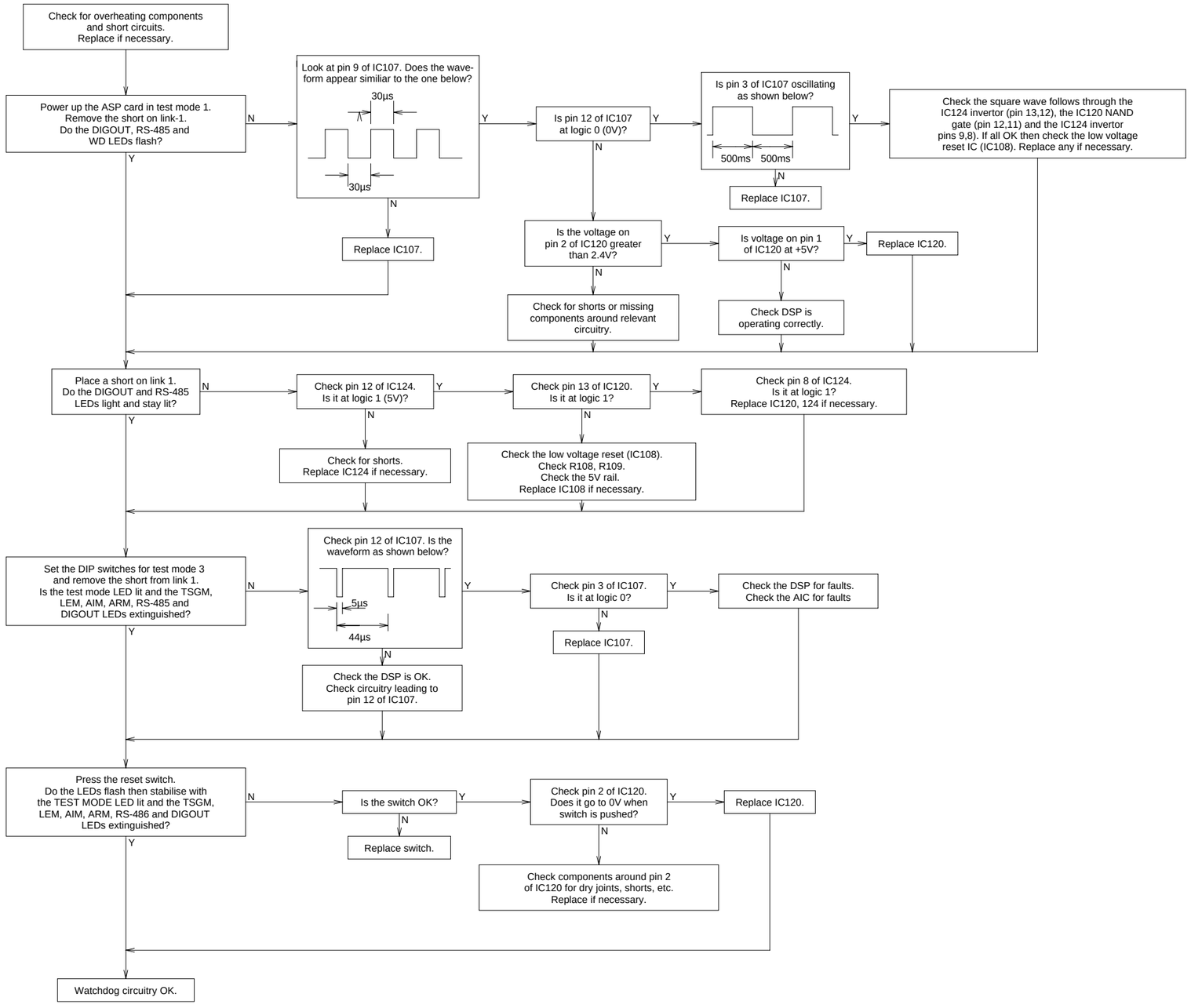
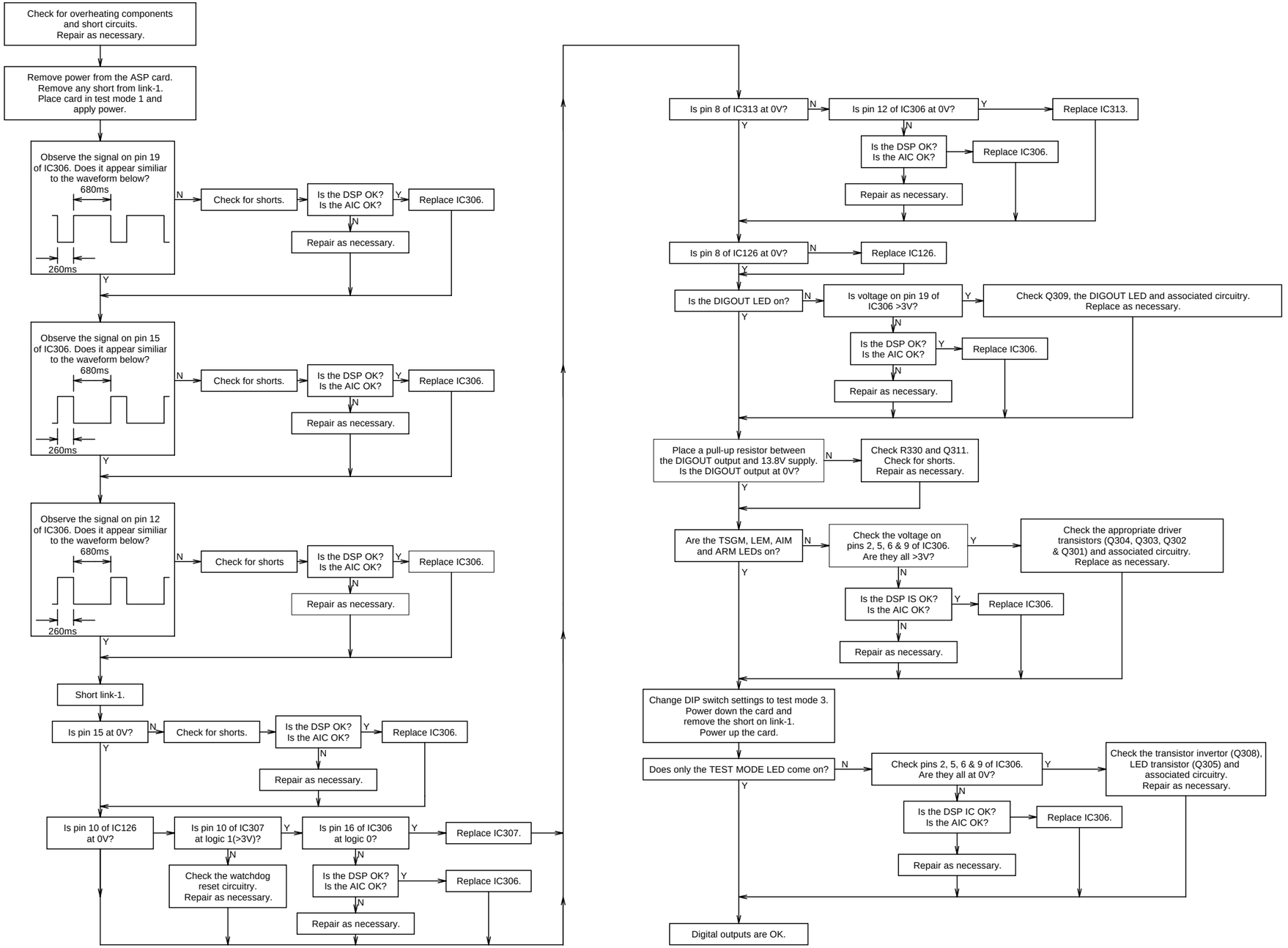
9.4.9 T805 Watchdog Timer



9.4.10 T805 Digital Outputs



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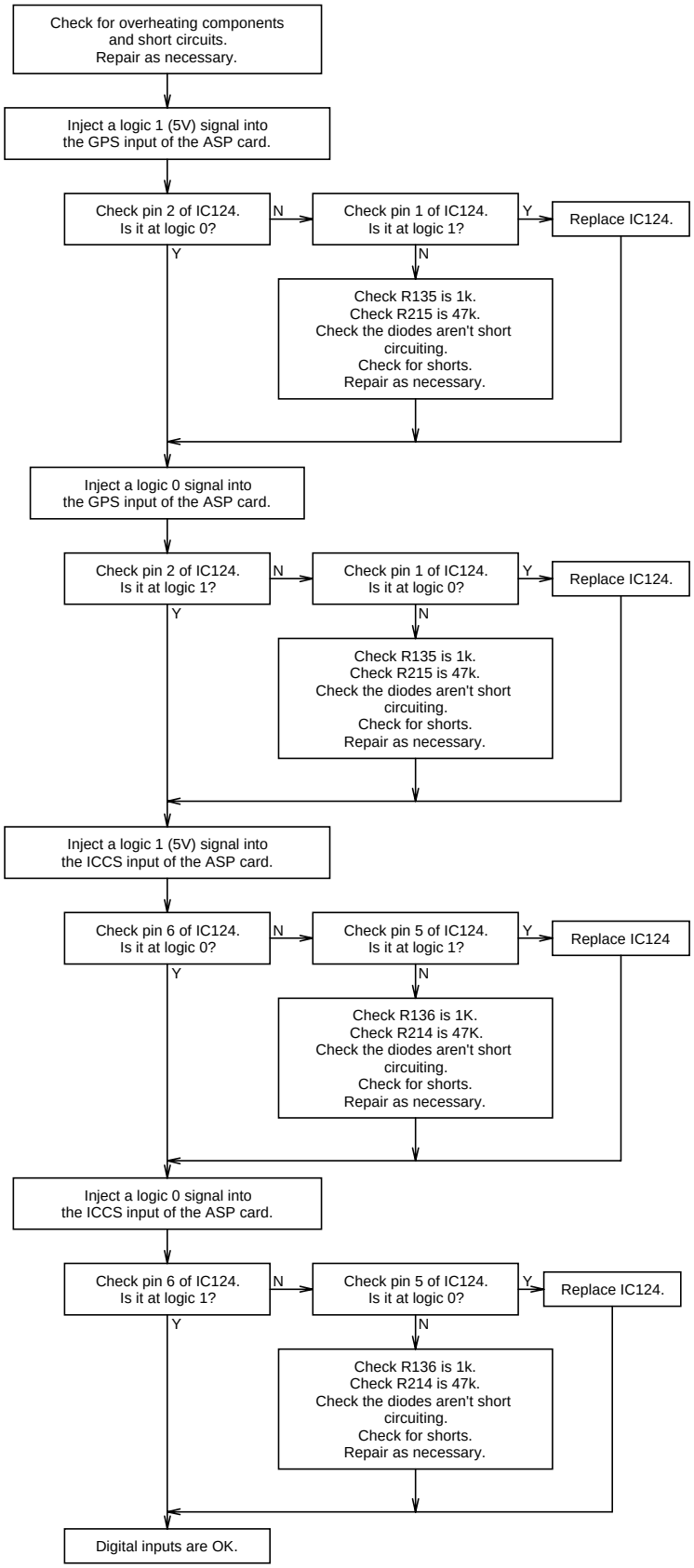
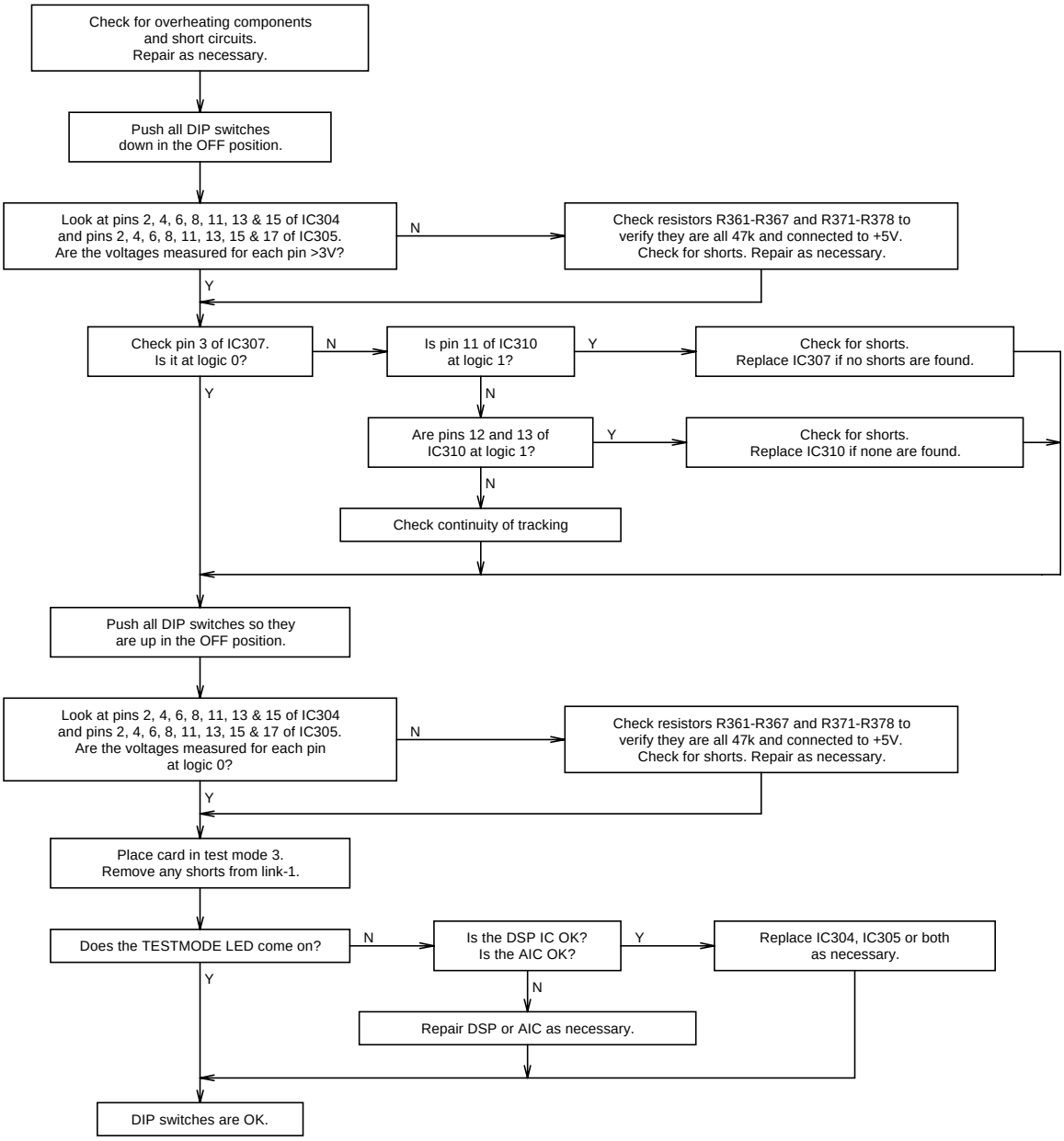
9.4.11 T805 Digital Inputs



9.4.12 T805 DIP Switches



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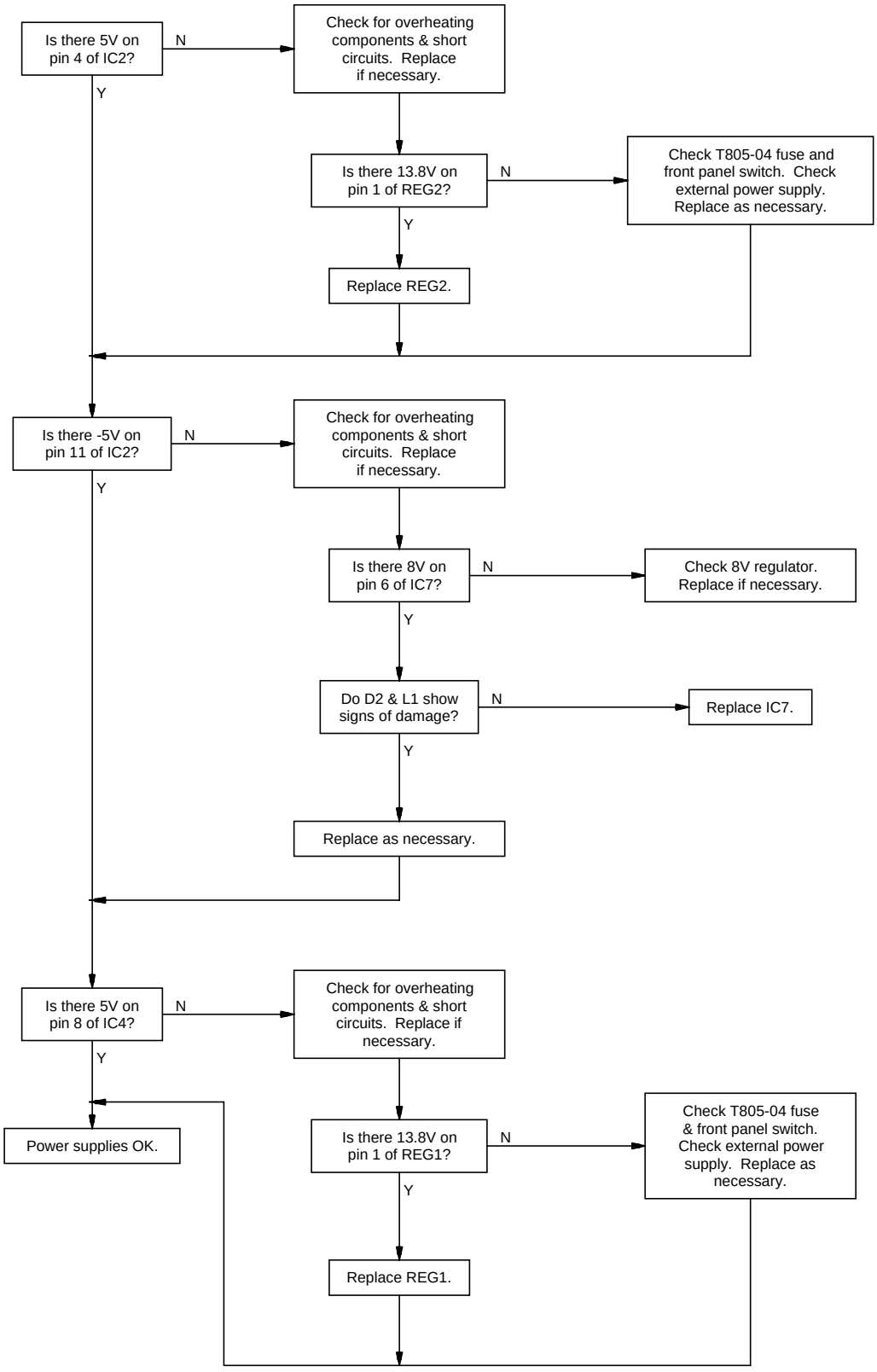
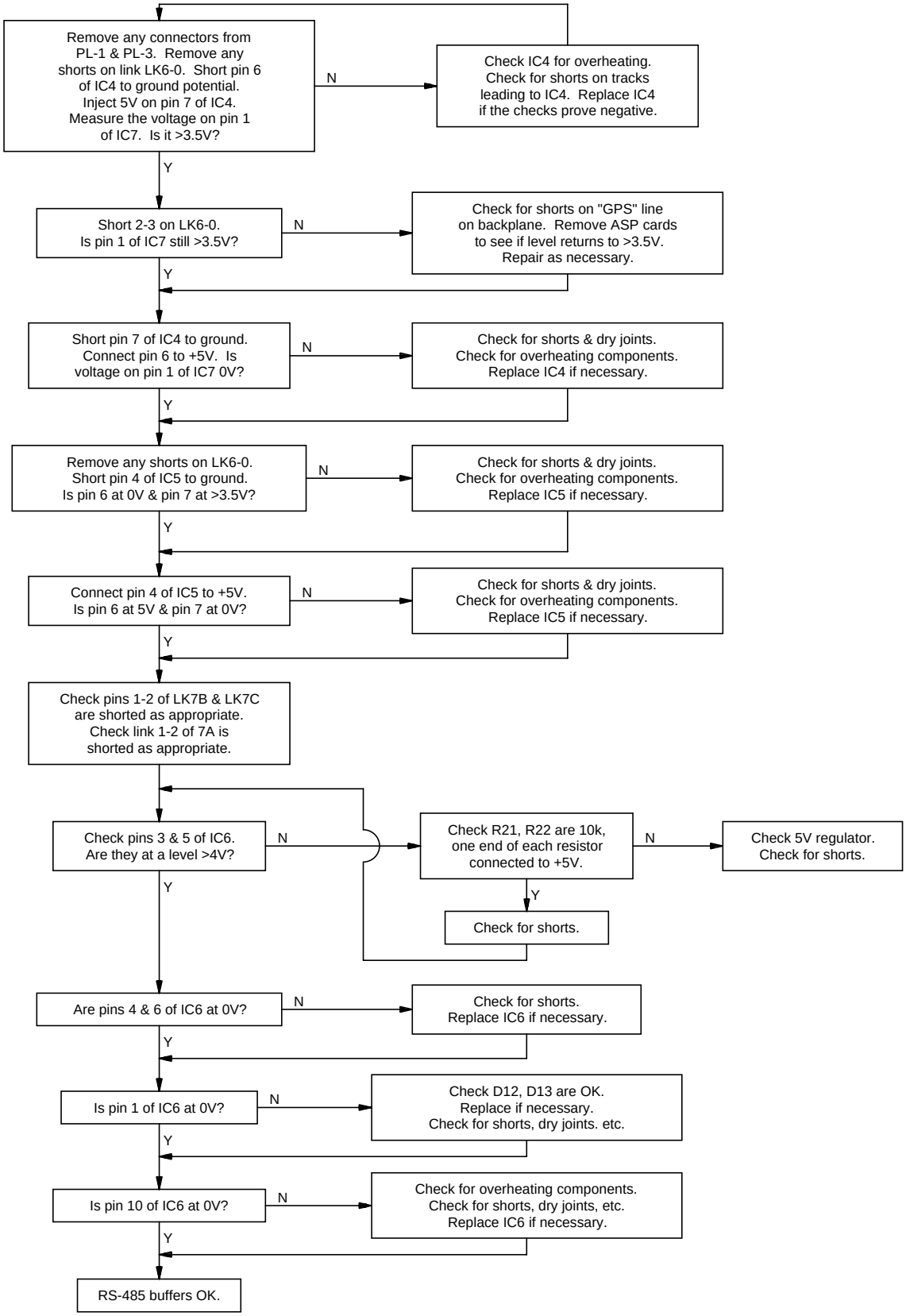
9.4.13 T805-04 Power Supplies



9.4.14 T805-04 RS-485 Buffers



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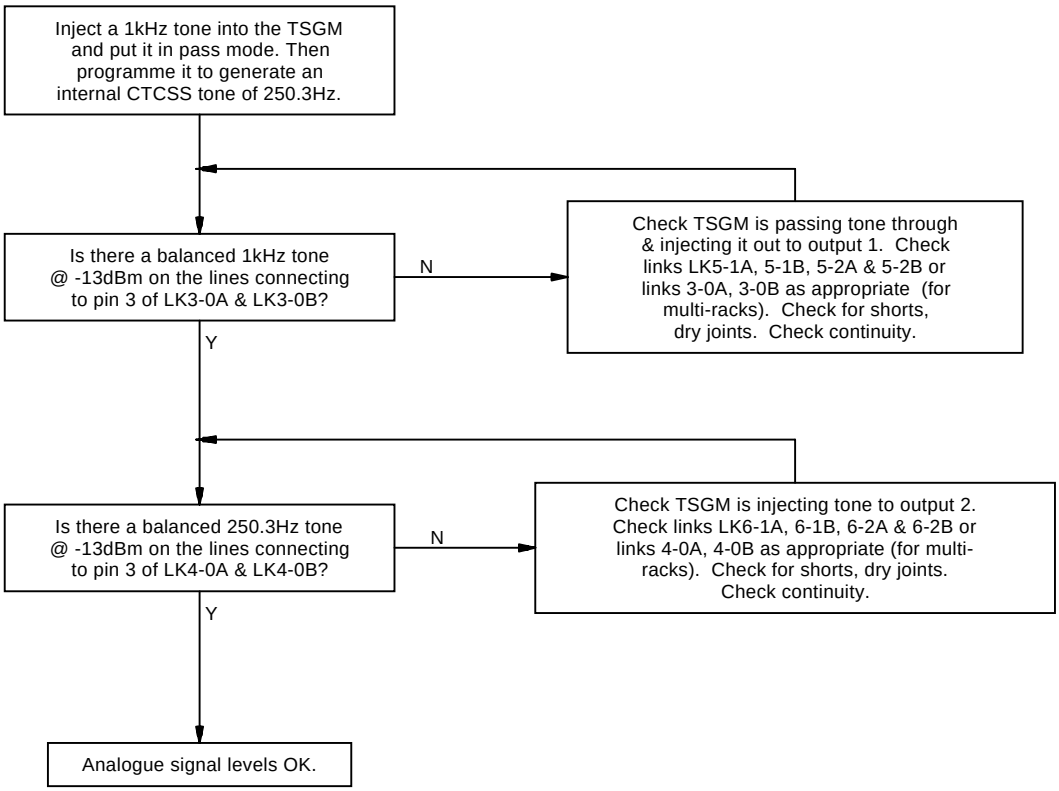
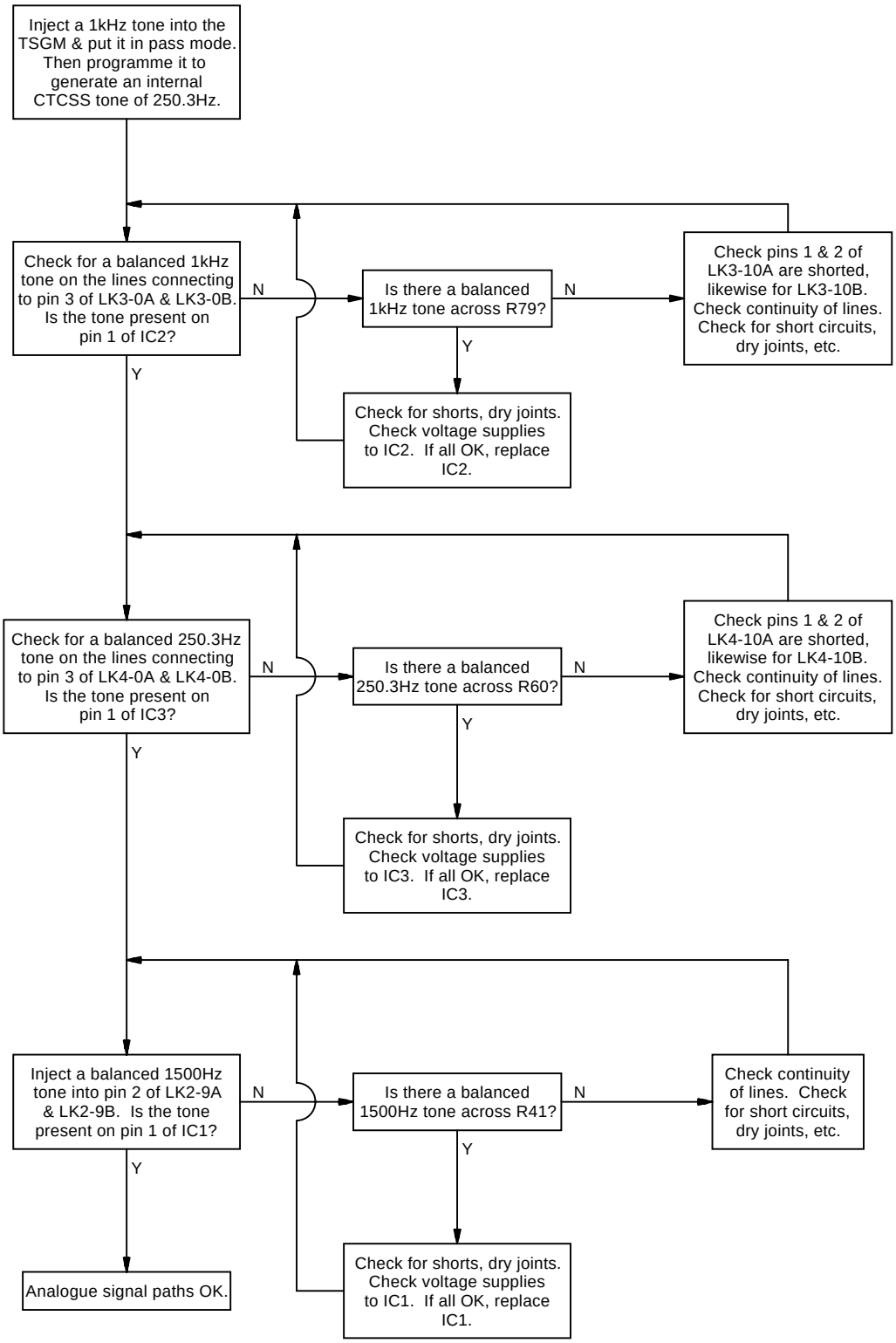
9.4.15 T805-04 Analogue Signal Levels



9.4.16 T805-04 Analogue Signal Buffers



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10 T805-04 Backplane

This section provides some general information on the T805-04 backplane PCB, along with detailed wiring and linking procedures when the T805-04 is used in single and multi-rack systems.

The following topics are covered in this section.

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10.1 Introduction

The Tait Quasi-Synchronous system is a modular product and may be housed in either one or more 6U high 483mm rack frames. A 1U high rack frame is also available for remote sites and is covered in Section 11.

Each 6U frame has a backplane PCB and slots (or ports) for either an LEM, TSGM, AIM or ARM. When the physical capacity of the rack has been exceeded, an additional rack may be easily added until the required number of ASP cards is fitted. The system is capable of operating 8 networks with either one or two TSGM cards per network. Up to 222 LEM ASP cards may be used per system. The number of AIMs and ARMs used is dependent on the system organisation.

Each ASP card is located in the rack by a guide which mates the rear connectors of the card and rack. The rack connector (a 32x2 DIN connector) supplies power to the card, as well as the audio, control and communications signals.

10.2 T805-04 Backplane Function

The T805-04 backplane serves a number of functions in the T805 Quasi-Synchronous system:

- to distribute power to the ASP cards;
- to provide a means of audio input and output from the ASP cards;
- to distribute this audio to other ASP cards and pass it on to other backplanes in the T805 Quasi-Synchronous system (if required);
- to provide a means of control signal input to and output from the ASP cards;
- to distribute these control signals to other ASP cards and pass them on to other backplanes in the T805 system (if required);
- to distribute the RS-485 communications to the ASP cards and pass them on to other backplanes in its Group.

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10.3 T805-04 Rack Wiring

10.3.1 Single Rack Wiring

10.3.1.1 Wiring Details

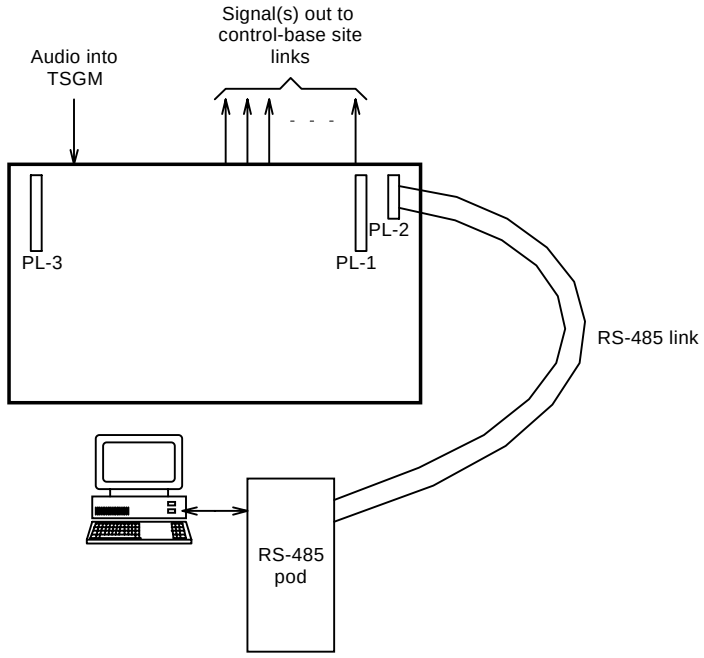

Figure 10.1 Single T805-04 Wiring Details

A single rack frame may be used when the T805 Quasi-Synchronous system requires no more than nine T805 ASP cards. In this situation the System Controller is addressing only one Group and the rack wiring is as shown in Figure 10.1. Ensure that the cables are not subjected to any stresses due to tight bends or incorrect lengths.

Where one rack frame is used, the TSGM occupies port 1 (or ports 1 and 2 if a main and standby TSGM are used).

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10.3.1.2 Linking Details

There are a number of links required to configure the backplane for the Audio Distribution network with which the T805 Quasi-Synchronous System is to operate. The tables below relate the linking arrangement to the Distribution System and the type of card being used in that port position.

These tables assume that only one TSGM is used in a single rack frame system and that it occupies port 1. Refer to Section 10.3.2 for linking details of multi-rack systems.

link 2-0A*	1-2
link 2-0B*	1-2
link 3-0A*	1-2
link 3-0B*	1-2
link 3-10A*	1-2
link 3-10B*	1-2
link 4-0A*	1-2
link 4-0B*	1-2
link 4-10A*	1-2
link 4-10B*	1-2
link 6-0	1-2
link 7A	1-2
link 7B	2-3
link 7C	2-3

*These links do not have to be configured for (and have been removed from) backplane PCB issue 220-01254-04.

	Single TSGM In Rack	Two TSGMs In Rack (Main & Standby)
link 1-1	2-3	1-2
link 1-2	2-3	1-2

Table 10.1 Linking details for single rack frame. These are independent of type of Distribution System or ASP cards used.

	TSGM	LEM	AIM	ARM
link 2-XA link 2-XB	2-3 2-3	see 10.3.1.3 see 10.3.1.3	2-3 2-3	2-3 2-3
link 2-X	2-3	see 10.3.1.3	2-3	1-2
link 3-XA link 3-XB	1-2 1-2	1-2 1-2	1-2 1-2	1-2 1-2
link 5-XA* link 5-XB*	1-2 1-2	1-2 1-2	1-2 1-2	1-2 1-2
link 6-XA* link 6-XB*	2-3 2-3	1-2 1-2	1-2 1-2	1-2 1-2

*These links apply only to ports 1 and 2 (i.e. X = 1 or 2 only).

X signifies the ASP card position, e.g. X=1 relates to linking details for an ASP card fitted to port 1.

Table 10.2 Linking details when the Quasi-Synchronous System is integrated with Audio Distribution System 1.

	TSGM	LEM	AIM	ARM
link 2-XA link 2-XB	2-3 2-3	see 10.3.1.3 see 10.3.1.3	2-3 2-3	2-3 2-3
link 2-X	2-3	see 10.3.1.3	2-3	2-3
link 3-XA link 3-XB	1-2 1-2	2-3 2-3	1-2 1-2	1-2 1-2
link 5-XA* link 5-XB*	2-3 2-3	1-2 1-2	1-2 1-2	1-2 1-2
link 6-XA* link 6-XB*	2-3 2-3	1-2 1-2	1-2 1-2	1-2 1-2

*These links apply only to ports 1 and 2 (i.e. X = 1 or 2 only).

X signifies the ASP card position, e.g. X=1 relates to linking details for an ASP card fitted to port 1.

Table 10.3 Linking details when the Quasi-Synchronous System is integrated with Audio Distribution System 2.

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10.3.1.3 Test Receiver Linking Details For A Single Rack System

(a) Introduction

As stated in previous sections, a monitor receiver may be connected to multiple LEMs. This section contains the linking details for connecting a monitor receiver to a single LEM or multiple LEMs.

This information is independent of the Audio Distribution Network to which the T805 Quasi-Synchronous system is connected.

(b) Test Receiver Feeding A Single LEM

The signal from a test receiver always feeds into the high impedance input (47kΩ) of the ASP card, input 2. The required terminating impedance of 600 ohms is linked in on the backplane.

When a receiver is to feed into a single LEM, link in the terminating resistance of 600 ohms by shorting position 1-2 of LK2-X, where X is the port position of the card on the backplane (X ranges between 2 & 9 since the TSGM occupies port 1).

Short position 2-3 of links LK2-XA, LK2-XB (open circuits) to prevent the received signal from being passed on to any other LEMs.

(c) Test Receiver Feeding Multiple LEMs

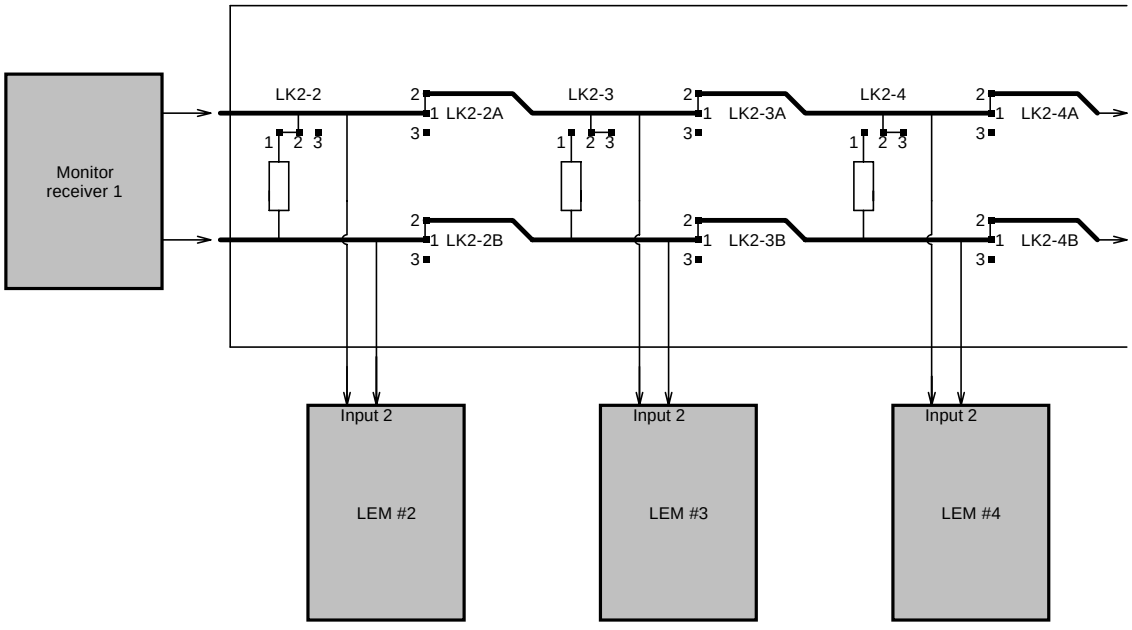

Figure 10.2 Example of test receiver feeding multiple LEMs - single rack system.

If a receiver is to feed more than one LEM, the LEMs must be fitted into consecutive positions in the rack frame: e.g. where monitor receiver 1 is to feed LEMs 2, 3 and 4, fit (for example) LEM-2 in port 2, LEM-3 in port 3 and LEM-4 in port 4.

Audio from monitor receiver 1 will be fed into LEM-2 via connector CN2-1 (input 2 of port 2). It is terminated into 600 ohms by shorting positions 1-2 of link LK2-2. Also, short positions 2-3 of LK2-3 and LK2-4 (open circuit termination since the input impedance is already set).

To enable audio to be passed from LEM-2 to LEM-3, short positions 1-2 of link pair LK2-2A and LK2-2B. For passing audio from LEM-3 to LEM-4, short positions 1-2 of link pair LK2-3A, LK2-3B. As the monitor receiver audio does not need to be passed on any further, short positions 2-3 of links LK2-4A and LK2-4B (an open circuit in the signal path).

10.3.2 Multi-rack Systems

10.3.2.1 Introduction

In multi rack systems where there are more than nine T805 ASP cards, the racks are linked via expansion connectors PL-1 and PL-3. The output connector, PL-3, passes on to the next rack in the series the following:

RS-485 communications for that Group
HF & LF audio signals
control signals (start gun pulse).

The T805 Quasi-Synchronous system is capable of supporting up to eight independent networks. Each network may use the expansion connectors for distributing signals if more than one rackplane is required. For large networks, multiple RS-485 communication groups may exist. When this is the case, internal linking on the backplane terminates that communications group. The next group is connected into the following backplane by PL-2. Audio and control signals are undisturbed and passed on via the PL-1 / PL-3 link.

It is recommended that, if possible, each network is uniquely associated with its own Group or Groups rather than having the same Group sharing multiple networks.

Example A possible arrangement for a T805 Quasi-Synchronous system is:

Network 1 has 1 TSGM, 22 LEMs and is connected to Group 1
Network 2 has 1 TSGM, 4 LEMs and is also connected to Group 1
Network 3 has 1 TSGM, 44 LEMs and is connected to Groups 1, 2 & 3.

This is a workable solution but is not recommended.

It is recommended that the solution should be implemented in the following manner:

Network 1 has 1 TSGM, 22 LEMs and is connected to Group 1
Network 2 has 1 TSGM, 4 LEMs and is connected to Group 2
Network 3 has 1 TSGM, 44 LEMs and is connected to Groups 3 & 4

This example is implemented in Figure 10.3.

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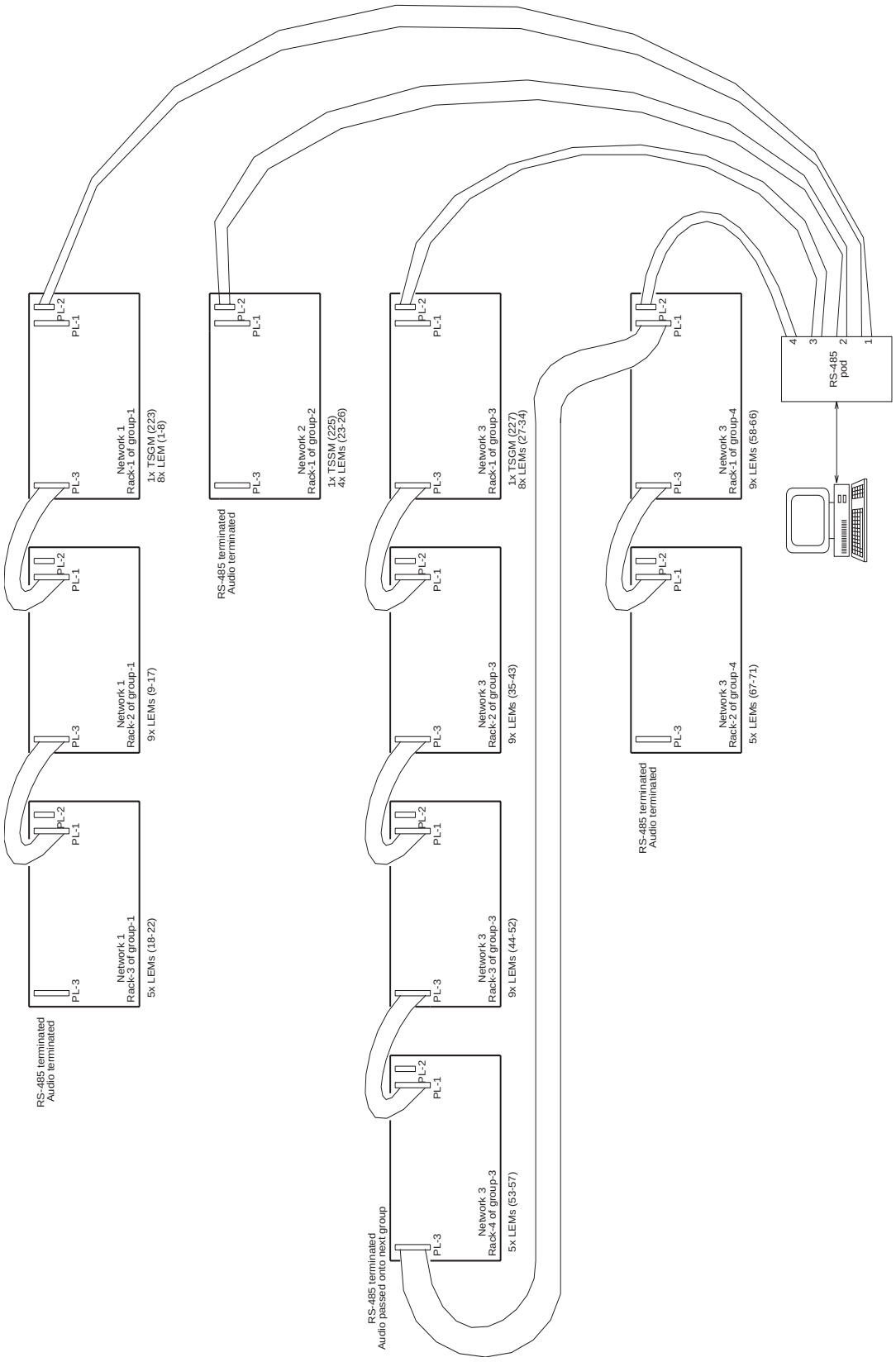

Figure 10.3 Suggested implementation of backplanes linking for the T805 system in the example.

10.3.2.2 Wiring Details

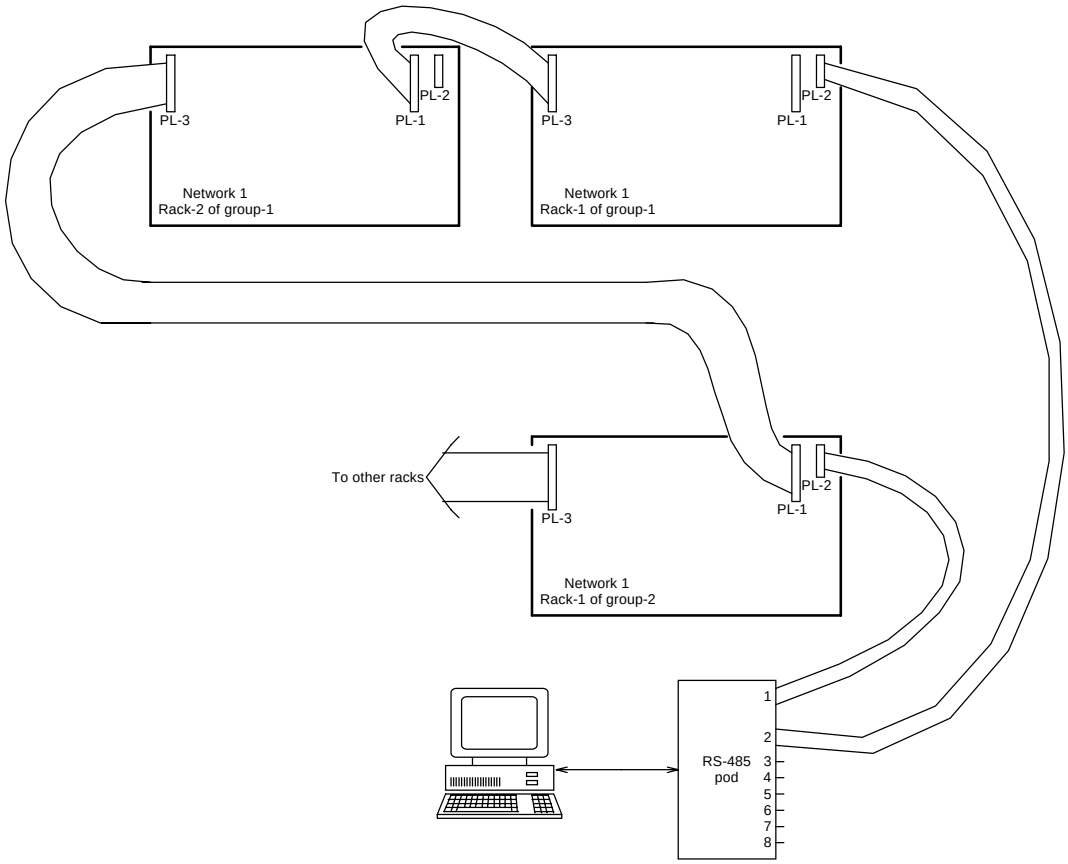

Figure 10.4 T805 System Multi-rack Wiring

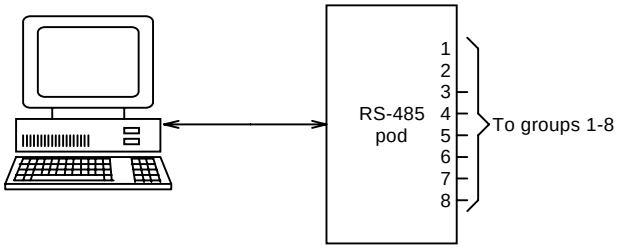

Figure 10.5 The RS-485 link between the System Controller, ACL-II card and backplanes.

Some audio and control signals may be common to many cards spread over a large number of T805-04 backplanes. These are linked via the PL-1 and PL-3 connectors in a series arrangement (signals are fed into a T805-04 via PL-1 and distributed to the next backplane via PL-3), as shown in Figure 10.4.

The "32 member Group" concept was introduced in Section 3 with respect to the RS-485 communications from the System Controller. Groups of 32 TSGM/LEM combinations are used for RS-485 communications to retain true RS-485 format. The AIMs and ARMs are not included because they do not communicate with the System Controller. Up to 8 Groups, totalling 222 LEM combinations and 8 TSGM pairs, may be supported.

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The ACL-II RS-485 serial communications board interfaces between the System Controller and the first backplane of each RS-485 Group to implement the Group structure (see Figure 10.5).

Note that in Figure 10.4 there are multiple links between the System Controller and backplanes. Each of these links is the connection between the System Controller and a different Group. The links are made to the first backplane of that Group, while the communications are distributed to other backplanes in that Group via the PL-1/PL-3 link. The link is terminated in the last backplane of the Group.

Shorting links on the backplane will determine whether or not the RS-485 signals are passed onto the next rack and will depend on whether the next rack is in the same 32 member Group of TSGM/LEM combinations. Note that the audio and control signals are passed onto the next rack, regardless of whether or not it is in the same group. They will not, however, be passed on if the next rack is the beginning of another network.

In multi-rack systems there can be either one or two TSGM cards per network. If there is one TSGM, it must occupy port 1 of the first rack (rack-1) in its network. As stated previously, it is recommended that a new communications Group is started for each new network in the T805 system. In this case the first rack of the network will have PL-1 unconnected to the previous rack in the system, but will use PL-3 to link audio and control signals (including RS-485) to the next rack in the network.

Under no circumstances should TSGMs occupy any other position than port 1 of the first rack in the network (if one TSGM is used) or ports 1 & 2 of the first rack in the network (if there are two TSGMs for that network).

If 1 TSGM is used, port 2 may be configured for either an LEM, AIM or ARM.

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10.3.2.3 Linking Details

The following tables contain the linking details for backplanes in a multi-rack system.

Note: Rack-1 is defined as the first rack in a network. A new Group is formed for each new network. The first rack of a network will have PL-1 unconnected and PL-3 will be linked to the second rack in that network.

Rack-N is defined as the last rack in the network (and the last rack in its Group) and will have PL-1 connected to the previous backplane. PL-3 will be unconnected.

	Rack-1 Of Network (And Group)	Racks -2 To -N Of Network	
		Monitor Receiver Audio From Previous Rack*	No Monitor Receiver Audio From Previous Rack*
link 2-0A link 2-0B	1-2 1-2	2-3 2-3	1-2 1-2

	Rack-1 Of Network (And Group)	Racks -2 To -N Of Network
link 3-0A link 3-0B	1-2 1-2	1-2 (ADC-1) 2-3 (ADC-2) 1-2 (ADC-1) 2-3 (ADC-2)
link 3-10A link 3-10B	1-2 1-2	1-2 1-2
link 4-0A link 4-0B	1-2 1-2	2-3 2-3
link 4-10A link 4-10B	1-2 1-2	1-2 1-2
link 6-0	1-2	2-3

*See Section 10.3.2.3

Table 10.4 Linking details for a multi-rack network consisting of N racks.

	First Rack & Other Racks In Group Of 32	Last Rack In Group Of 32
link 7A link 7B link 7C	2-3 1-2 1-2	1-2 2-3 2-3

Table 10.5 Linking details for each "Group" of racks in a multi-rack T805 Quasi-Synchronous network.

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The linking details as shown in Table 10.6 and 10.7 are the same as those for Table 10.2 and 10.3 respectively. They have been repeated here for ease of reference.

	TSGM	LEM	AIM	ARM
link 2-XA link 2-XB	2-3 2-3	see 10.3.2.4 see 10.3.2.4	2-3 2-3	2-3 2-3
link 2-X	2-3	see 10.3.2.4	2-3	1-2
link 3-XA link 3-XB	1-2 1-2	1-2 1-2	1-2 1-2	1-2 1-2
link 5-XA* link 5-XB*	1-2 1-2	1-2 1-2	1-2 1-2	1-2 1-2
link 6-XA* link 6-XB*	2-3 2-3	1-2 1-2	1-2 1-2	1-2 1-2

*These links apply only to ports 1 and 2 (i.e. X = 1 or 2 only).

X signifies the ASP card position, e.g. X=1 relates to linking details for an ASP card fitted to port 1.

Table 10.6 Linking details when the Quasi-Synchronous System is integrated with Audio Distribution System 1.

	TSGM	LEM	AIM	ARM
link 2-XA link 2-XB	2-3 2-3	see 10.3.2.4 see 10.3.2.4	2-3 2-3	2-3 2-3
link 2-X	2-3	see 10.3.2.4	2-3	2-3
link 3-XA link 3-XB	1-2 1-2	2-3 2-3	1-2 1-2	1-2 1-2
link 5-XA* link 5-XB*	2-3 2-3	1-2 1-2	1-2 1-2	1-2 1-2
link 6-XA* link 6-XB*	2-3 2-3	1-2 1-2	1-2 1-2	1-2 1-2

*These links apply only to ports 1 and 2 (i.e. X = 1 or 2 only).

X signifies the ASP card position, e.g. X=1 relates to linking details for an ASP card fitted to port 1.

Table 10.7 Linking details when the Quasi-Synchronous System is integrated with Audio Distribution System 2.

10.3.2.4 Linking Details For The Test Receiver (Multi-rack Systems)

(a) Test Receiver Feeding A Single LEM

The signal from a test receiver always feeds into the high impedance input (47kΩ) of the ASP card, input 2. The required terminating impedance of 600 ohms is linked in on the backplane.

When a receiver is connected to a single LEM, link in the terminating resistance of 600 ohms by shorting positions 1-2 of link LK2-X, where X is the port position of the card on the backplane (X ranges between 1 & 9).

Short position 2-3 of links LK2-XA, LK2-XB (open circuits) to prevent the received signals from being passed on to any other LEMs.

(b) Test Receiver Feeding Multiple LEMs

When a receiver is to feed more than one LEM, the procedure is similar to that described in Section 10.3.1.3 (b), the only difference being that the monitor receiver audio may have to be passed onto the next backplane in the series. As before, the LEMs must be placed consecutively, with this trend being continued onto the next rack.

If the monitor receiver audio is being passed from rack "i" to rack "i+1", short positions 2-3 of links LK2-0A & LK2-0B of rack "i+1" to ***enable*** the audio to be fed into that rack. Otherwise, short positions 1-2 of link LK2-0A & LK2-0B on rack "i+1" to ***prevent*** the audio being passed on from rack "i".

Example The monitor receiver feeds audio to LEMs 7, 8 and 9 of rack-2 and LEMs 1, 2 and 3 of rack-3.

Rack-2 linking details:

Audio from the monitor receiver will be fed into LEM-7 via connector CN7-1 (input 2 of port 7) and is terminated into 600 ohms by shorting position 1-2 of LK2-7.

Short position 2-3 of links LK2-8 and LK2-9 (open circuit) since the 600Ω termination is provided by LEM-7 position.

Audio is passed from LEM-7 to LEM-8 by shorting position 1-2 on links LK2-7A & LK2-7B, and from LEM-8 to LEM-9 by shorting position 1-2 on links LK2-8A & LK2-8B.

The audio is then passed from rack-2 to rack-3 by shorting position 1-2 on the final links in the series, LK2-9A & LK2-9B.

Rack-3 linking details for example:

The audio is buffered and fed from PL-3 on rack-2 into PL-1 on rack-3. It is then passed to LEM-1 by linking position 2-3 of links LK2-0A & LK2-0B.

Short positions 1-2 of links LK2-1A & LK2-1B to pass the signal

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from LEM-1 to LEM-2. Short positions 1-2 of links LK2-2A & LK2-2B to pass the signal from LEM-2 to LEM-3.

Short positions 2-3 of links LK2-3A & LK2-3B to prevent the audio from being passed any further (an open circuit to discontinue the signal).

In being passed from rack-2 to rack-3, the audio is passed through a buffer amplifier and so requires a 600Ω termination. This termination is provided by shorting positions 1-2 of LK2-1.

Short positions 2-3 of links LK2-2 and LK2-3 (open circuit) since the 600Ω termination is provided by LEM-1 position.

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10.4 Connection Tables

The following tables should assist the understanding of the connections required between the T805 Quasi-Synchronous system and the transmitters and audio distribution network to which it is connected.

TSGM Inputs	Nominal Level	Assignment
speech (300-2550Hz) + key tone (2970Hz)	-10dBm -23dBm	input 1
external CTCSS (optional) (software v2.11 & earlier: 67-250.3Hz software v2.12 & later: 67-259.1Hz)	-13dBm	input 2

TSGM Outputs	Nominal Level	Assignment
speech / HF training audio (300-2550Hz) + key tone (2970Hz)	-10dBm -23dBm	output 1 output 1
CTCSS / LF training audio (software v2.11 & earlier: 67-250.3Hz software v2.12 & later: 67-259.1Hz)	-13dBm	output 2
start gun / synchronisation pulse	TTL digital	"DIGOUT"

Table 10.8 TSGM input/output assignments. Note that they are independent of the Audio Distribution Network to which the T805 system is connected.

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LEM Inputs	Nominal Level	Assignment
speech (300-2550Hz) + key tone (2970Hz)	-10dBm -23dBm	input 3
external CTCSS (software v2.11 & earlier: 67-250.3Hz software v2.12 & later: 67-259.1Hz)	-13dBm	input 4
test receiver audio	-10dBm	input 2
training synchronisation pulse	TTL digital	"GPS"
Breakout Operation		
speech (300-2550Hz) + key tone (2970Hz)	-10dBm	input 3 (ADC-1) input 1 (ADC-2)
Quasi-Synchronous breakout control	TTL digital	"ICCS"
logic 0 = normal (Quasi-Synchronous operation) logic 1 = breakout operation		

LEM Output To AIM (Remote Transmitter)	Nominal Level	Assignment
speech / HF training audio (300-2550Hz) + key tone (2970Hz) + CTCSS (software v2.11 & earlier: 67-250.3Hz software v2.12 & later: 67-259.1Hz)	-10dBm -23dBm -13dBm	output 1

Table 10.9 LEM Input/Output Assignments.

AIM Inputs	Nominal Level	Assignment
speech / HF training tone (300-2550Hz) + key tone (2970Hz) + CTCSS / LF training tone (software v2.11 & earlier: 67-250.3Hz software v2.12 & later: 67-259.1Hz)	-10dBm -23dBm -13dBm	input 1

AIM Outputs	Nominal Level	Assignment
inverted speech (350-2833Hz) + CTCSS + inversion tone (2900Hz) or inverted HF / LF training tones (350-2833Hz) + inversion tone (2900Hz)	-10dBm -13dBm -23dBm	output 1

Table 10.10 AIM Input/Output Assignments.

ARM Inputs	Nominal Level	Assignment
inverted speech (350-2833Hz) + CTCSS + inversion tone (2900Hz) or inverted HF / LF training tones (350-2833Hz) + inversion tone (2900Hz)	-10dBm -13dBm -23dBm	input 1

ARM Outputs	Nominal Level	Assignment
speech / HF training tone (300-2550Hz) + key tone (2970Hz)* [+ CTCSS / LF training tone (software v2.11 & earlier: 67-250.3Hz software v2.12 & later: 67-259.1Hz)]	-12dBm -23dBm -13dBm	output 1
CTCSS / LF training tone (software v2.11 & earlier: 67-250.3Hz software v2.12 & later: 67-259.1Hz)	-13dBm	output 2
transmitter control	open collector	"DIGOUT"
high for transmitter idle low to enable transmitter		

*Optional

Table 10.11 ARM Input/Output Assignments.

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10.5 Power Supply

Each rack frame in the system is individually supplied with +13.8V which is controlled by a front panel switch. This allows individual parts of the system to be powered down independently for servicing.

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11 T805-06 1U Rack

The T805-06 is a 1U rack specifically designed for use in remote sites where an AIM / ARM combination is used. The T805-06 may be configured as either an AIM or ARM depending on the application for which it is being used.

The following topics are covered in this section.

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11.1 Function

When configured as an ARM, the T805-06 is the second half of the AIM / ARM combination used to link an LEM with a remote transmitter. The signal from the AIM is passed down the link to the T805-06. Within the T805-06 are a Telecom approved line barrier unit (LBU)[1] and an interface board for linking signals into the ASP card. Linking details for the T805-06 configured in this manner are covered in Section 11.2.3.

When configured as an AIM, the T805-06 is the first half of the AIM / ARM combination used to link a remote monitor receiver with the appropriate LEM(s) at the main site. The monitor receiver audio is passed into the T805-06 which contains the AIM. The output from the AIM is fed into an interface board which links it to a Telecom approved LBU[1]. Linking details for the T805-06 configured in this manner are covered in Section 11.2.3.

In the UK the T805 system is approved for indirect connection into the Telecom speech band circuits (BS6328). The T805 is BABT approved for use only with the CYFAS 88 / 0507 Line Barrier Units. Approval will be invalidated unless the T805 is used in conjunction with this barrier.

1. Fitted when the link is a Telecom line. Where an AIM-ARM combination is used for linking into a Telecom system, the T805 system must meet the approval requirements of that country.

11.2 Wiring

11.2.1 Configured As A Remote ARM

Refer to Section 7.1.6 for the DIP switch configuration of an ARM.

The signal from the link is fed into the T805-06 and an optional line barrier unit[1]. A wire link between the LBU and TB2 connects this signal to the interface board and therefore the ASP card.

Audio from the ARM is passed to the interface board and then to the transmitter via TB3 (HF audio) and TB4 (LF audio). Note that for correct Quasi-Synchronous operation both of these outputs must be connected to the transmitter, even if CTCSS is not used.

If dual transmitters are used, HF audio is passed to transmitter 1 via TB3 and transmitter 2 via TB16. The LF output is fed from TB4 to both transmitters.

Transmitter keying using the active low output of the ARM is via TB5.

If any line signalling from the remote to the main site is required, connect the output from the signalling unit to TB7 on the interface board. Short positions 2-3 of links LINK7 and LINK8. Wiring between TB6 and the LBU connects this signal to LBU.

11.2.2 Configured As A Remote AIM

Refer to Section 7.1.5 for the DIP switch configuration of an AIM.

The signal from the monitor receiver is fed into the T805-06 via TB2. This links the signal with the ASP card.

Short positions 1-2 of the links LINK7 and LINK8. This connects the output signal of the AIM with TB6. Wiring between TB6 and the LBU connects this signal to the LBU[2].

1. Fitted for use when the control-base link is via a Telecom line.
2. The wiring between the line barrier unit and the Telecom lines must meet the approval requirements of that country.

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11.2.3 Interface PCB Terminations

The T805-06 may be connected to dual transmitters or transmitters with non-standard input terminations.

Links 2 to 6 and 9 to 12 provide the necessary terminations for the ASP card and linking equipment. Refer to Table 11.1 for link settings.

The default settings for the links are used when the T805-06 is connected to a single transmitter and the link equipment has balanced 600Ω terminations.

Link	Single Transmitter (CTCSS input is high impedance; audio input is 600Ω balanced)	Dual Transmitters (CTCSS input is high impedance; audio input is 600Ω balanced)	600Ω Balanced Terminations On Link Equipment
2	N/A	N/A	shorted
3	N/A	N/A	N/A
4	N/A	N/A	N/A
5	N/A	N/A	N/A
6	open circuit	open circuit	N/A
9	shorted	open circuit	N/A
10	shorted	open circuit	N/A
11	shorted	open circuit	N/A
12	shorted	open circuit	N/A

N/A = not applicable

Table 11.1 T805-06 interface PCB link settings.

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12 T805 System Controller

This section provides a brief description of the Quasi-Synchronous system controller.

The following topics are covered in this section.

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12.1 Introduction

The T805 Quasi-Synchronous system is controlled by an IBM[1] compatible 80386 (or better) based computer. Communications between the computer and the LEMs and TSGM(s) in the racks are via an RS-485 communications link. The details of the connections between the system controller and the rack frames will be found in Section 10.3.1.1 and Section 10.3.2.1.

Refer to the Quasi-Synchronous System Controller User Guide for more information.

12.2 Power Supply

The computer is powered by 230V AC mains. An uninterruptible power supply is recommended if the system is remotely located.

1. IBM is a registered trade-mark of International Business Machines Ltd.

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13 Commissioning Tests

The following procedure will confirm that the Quasi-Synchronous System has been programmed and adjusted correctly and is operating satisfactorily. However, it does not test its integration into the audio distribution system. Additional testing will be required as it is a function of the audio distribution system and cannot be covered in this manual.

Carrying out the training procedure as described below will completely test the functionality of the system, as the TSGM will send training tones to all transmitters via their LEMs (and AIMs & ARMs if fitted). The test receivers will, via their AIMs and ARMs (if fitted), provide a return path for the training signal to complete the calibration of the system.

The following topics are covered in this section.

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13.1 Power-Up

Ensure that all racks are fitted and connected as described in Sections 7 & 10.

Switch on all racks with the rocker switch on the front panel of each rack. Check that the "power on" indicator LED on each front panel lights up.

Switch on the Quasi-Synchronous System Controller. Wait for approximately 2 minutes while the computer boots up and begins polling the T805 ASP cards.

Any one of the card racks may now be switched off without affecting the function of the others. It is essential that individual card racks are turned off before removal or insertion of a T805 ASP card.

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13.2 System Test Levels

Figure 13.1 shows a typical TSGM/LEM/AIM/ARM/monitor receiver combination with test levels. Ensure these are measured and verified. Refer to Section 7 if there is a discrepancy.

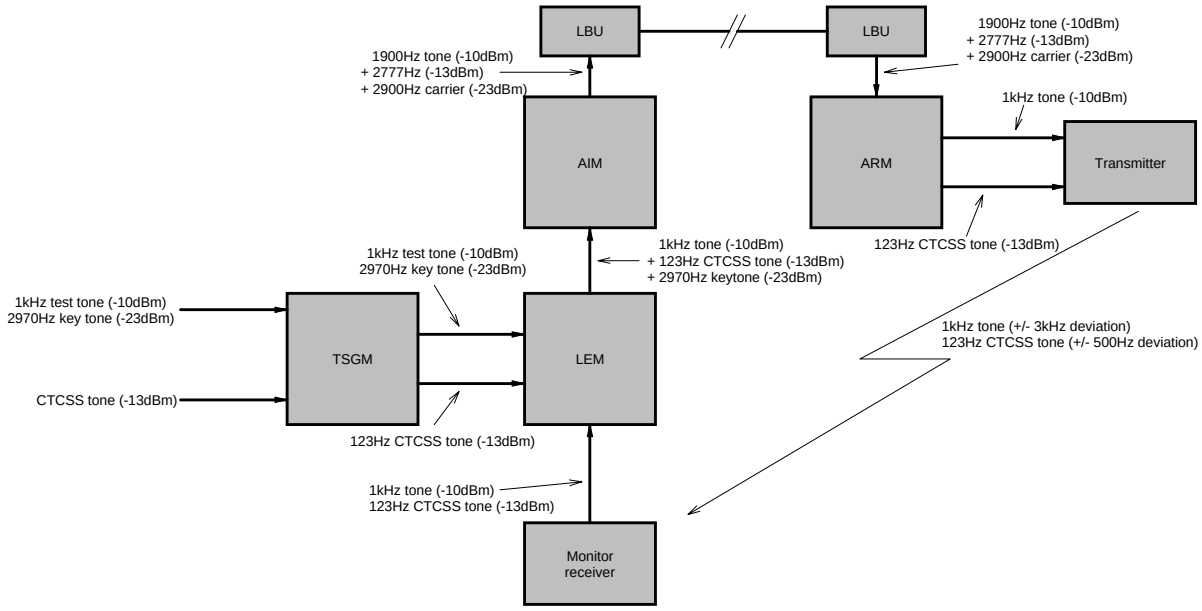

Figure 13.1 Test Levels For A TSGM/LEM/AIM/ARM/Monitor Receiver Combination

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13.3 Testing Training Procedure

Once the System Controller has been booted up, the Quasi-Synchronous operating software becomes operational. It is possible to train the system "manually" if the operator is a System Supervisor or Engineer. Assuming this is the case, the following procedure may be used.

- Log onto the T805 System Controller.

- Select the "Maintenance" menu:

  If you have a mouse, move the cursor to the "Maintenance" menu title and click the left mouse button once; alternatively, press the <ALT> key followed by the <M> key.

- Select the "Manual training" option from the "Maintenance" menu:

  Move the cursor with the mouse to the "Manual training" option and click the left mouse button once; alternatively, press the <M> key.

  The manual training window will appear with the "Network" line highlighted.

  Select the network you wish to train by using the up / down arrow keys.

- Press the <TAB> key to highlight the "Sequence" line.

  Select the sequence you wish to train to by using the up / down arrow keys.

  As you move through the various sequences available the "Training Steps" window will change, showing the various training sequences available.

- Press the <TAB> key to move to the "Training Steps" window.

  Move the up / down arrow keys to the first step of the training sequence you wish to be performed (note that the first step MUST be a "Master Reference Step").

  After moving to the first step, press the <SHIFT> key and the down arrow key until all the steps you wish to be performed are highlighted (note that the last step in the training sequence MUST be a "Break" step).

- Press the <ALT> key followed by the <S> key to initiate the training sequence.

- The training sequence will then proceed.

  Should there be a failure in any part of the system, a warning box will appear on the screen and an indication of the fault will be displayed.

  Depending on the fault, further interrogation may be possible using "Maintenance" sub-menu.

  For more information on this option refer to the Quasi-Synchronous System Controller Operator's Manual. If a hardware fault is indicated, refer to Section 9, Fault Finding.

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14 PCB Information

This section provides parts lists, grid reference indices, PCB layouts and circuit diagrams for each of the PCBs used in the Quasi-Synchronous system.

This section contains the following information.

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14.1 Introduction

PCB Identification

All PCBs are identified by a unique 10 digit number, the last 2 digits of which define the issue status. The issue status starts at 00 and increments through 01, 02, 03, etc. as the PCB is updated. Some issue PCBs never reach full production status and are therefore not included in this manual. A letter following the 10 digit IPN has no relevance in identifying the PCB for service purposes.

Parts Lists

The 10 digit numbers (000-00000-00) in this Parts List are "internal part numbers" (IPNs). Your spare parts orders can be handled more efficiently if you quote the IPN and provide a brief description of the part.

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc.) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped firstly by PCB, then by component type in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Grid Reference Index

To assist in locating components and labelled pads on the PCB layouts and circuit diagrams, a component grid reference index has been provided. This index lists the components and pads in alphabetical order, along with the appropriate alphanumeric grid references.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

Using CAD Circuit Diagrams

Reading a CAD circuit diagram is similar to reading a road map, in that both have an alphanumeric border. The circuit diagrams in this manual use letters to represent the horizontal axis, and numbers for the vertical axis. These circuit diagram "grid references" are useful in following a circuit that is spread over two or more sheets.

When a line representing part of the circuitry is discontinued, a reference will be given at the end of the line to indicate where the rest of the circuitry is located. The first digit refers to the sheet number (printed on the bottom right hand corner of the CAD diagram) and the last two characters refer to

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the location on that sheet of the continuation of the circuit (e.g. 1-D4).

If more than one line is represented (indicated by a double thickness line), a dot with a reference label will follow the route each individual line represents.

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14.2 T805-02 ASP Card

This section contains the following information.

T805-02 Parts List (IPN 220-01253-01)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped by component type in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

R220/250/280/283	The value of these components has been changed from 10k to 47k to increase the input impedance (95/11-7104).

Ref	Var	IPN	Description
ARM		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
AIM		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
C103		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C104		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C105A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C105B		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C105C		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C105D		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C106		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C107		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C109		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C110		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C111		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C112		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C113		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C114		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C115		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C116		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C117		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C118		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C120		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C121		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C122		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C124		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C125		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C126		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C127		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C130		022-54220-10	CAP MYLAR AI 2N2 5% 63V POTTED
C131		022-54470-10	CAP MYLAR AI 4N7 5% 63V POTTED
C132		020-07100-02	CAP ELECT RADL 1M 50V 5X11MM
C134		022-54470-10	CAP MYLAR AI 4N7 5% 63V POTTED
C135		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C136		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C150		020-09470-07	CAP 470M 16V 20% ELEC VERT 8*20 3.5MM L/
C151		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C152		020-09470-07	CAP 470M 16V 20% ELEC VERT 8*20 3.5MM L/
C153		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C154		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C155		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C156		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C157		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C158		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C159		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C160		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C161		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C162		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C163		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C170		020-09470-07	CAP 470M 16V 20% ELEC VERT 8*20 3.5MM L/
C171		020-09470-07	CAP 470M 16V 20% ELEC VERT 8*20 3.5MM L/
C201A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C201B		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C201C		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C202A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C202B		020-09220-06	CAP ELECT RADL 220M 16V 8X11.2MM
C202C		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C203A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C203B		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C203C		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C204A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C204B		020-09220-06	CAP ELECT RADL 220M 16V 8X11.2MM
C204C		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C205A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C205B		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C205C		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C206		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C207		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C208		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C209		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C210A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C210B		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C210C		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C211A		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C211B		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C211C		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C212		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C220		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C221		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C222		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C223		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C224		020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR
C225		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C226		011-53100-01	CAP CER AI 100P 5% N150 50/63V
C227		020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR
C230		020-09220-06	CAP ELECT RADL 220M 16V 8X11.2MM
C231		020-09220-06	CAP ELECT RADL 220M 16V 8X11.2MM
C232		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C233		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C234		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C235		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C236		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C237		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C238		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C239		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C240		020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR
C241		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C242		011-53100-01	CAP CER AI 100P 5% N150 50/63V
C243		020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR
C245		020-09220-06	CAP ELECT RADL 220M 16V 8X11.2MM
C246		020-09220-06	CAP ELECT RADL 220M 16V 8X11.2MM
C247		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C248		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C249		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C250		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C251		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C252		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C253		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C254		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C255		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C256		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C257		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C258		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C259		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C260		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C261		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C262		020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR
C285		020-08470-02	CAP ELECT RADL 47M 16V 6X11MM
C286		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED

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Ref	Var	IPN	Description
C287		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C289		022-55220-10	CAP MYLAR AI 22N 5% 63V POTTED
C290		022-55220-10	CAP MYLAR AI 22N 5% 63V POTTED
C301		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C302		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C304		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C305		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C306		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C307		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C308		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C309		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C310		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C313		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C314		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C315		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C321		011-52220-01	CAP CER AI 22P 5% N150 50/63V
C322		011-52220-01	CAP CER AI 22P 5% N150 50/63V
DIGOUT		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
D101		001-00011-05	(S) DIODE MUR105 ULTRA FAST 50V 1AMP
D102		001-00011-05	(S) DIODE MUR105 ULTRA FAST 50V 1AMP
D103		001-00011-50	(S) DIODE MUR810 8A 100V FAST RECOVERY T
D104		001-50015-11	(S) DIODE ZENER AI 5V1 0.4W BZX79/C5V1
D106		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D107		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D108		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D109		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D110		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D111		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D112		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D113		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D114		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D115		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D116		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D201		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D202		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D203		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D204		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D207		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D210		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D216		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D220		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D221		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D223		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D301		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D302		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D303		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
D304		001-50012-05	(S) DIODE AI 1N4531 SI SMALL SIG
IC101		002-00257-60	(S) IC LM2576 5V SWTCHNG REG
IC102		002-00078-08	(S) IC MC7808ACT 8V REG(LINEAR)1AMP TO-
IC103		002-00063-50	(S) IC MAX635 -5V INVERTING REGULATOR
IC104		002-00063-50	(S) IC MAX635 -5V INVERTING REGULATOR
IC105		002-20320-26	(S) IC TMS320C26 DIG SIG PROCESSOR
IC106		274-00010-51	XTAL OSCILLATOR 40.0MHZ DIL
IC107		002-00016-27	(S) IC 4060B 14STAGE RIPPLE COUNTER+OSC
IC108		002-00013-05	(S) IC MC34064P-5 UNDER VOLT SENSE TO-2
IC109		002-74201-12	(S) IC 74F112 "FAST" DUAL JK F/F WITH S
IC110		002-74201-12	(S) IC 74F112 "FAST" DUAL JK F/F WITH S
IC111		002-00018-35	(S) IC MK48Z18-150NS ZERO PWR RAM 8KX8
IC112		002-74202-45	(S) IC 74F245 "FAST" OCTAL TRI-STATE BU
IC113		002-00018-35	(S) IC MK48Z18-150NS ZERO PWR RAM 8KX8
IC114		002-74202-45	(S) IC 74F245 "FAST" OCTAL TRI-STATE BU
IC115		002-02725-62	(S) IC 27C256-12 120NS 32KX8 EPROM
IC116		002-74202-44	(S) IC 74F244 "FAST" OCTAL TRI-STATE BU
IC117		002-02725-62	(S) IC 27C256-12 120NS 32KX8 EPROM
IC118		002-74202-44	(S) IC 74F244 "FAST" OCTAL TRI-STATE BU
IC120		002-74000-00	(S) IC 74HC00 QUAD 2 I/P NAND GATE
IC121		002-74200-00	(S) IC 74F00 "FAST" QUAD 2 INPUT NAND
IC122		002-74200-00	(S) IC 74F00 "FAST" QUAD 2 INPUT NAND
IC124		002-74000-14	(S) IC 74HC14 HEX SCHMITT TRIG INVERTR
IC125		002-74200-20	(S) IC 74F20 "FAST" DUAL 4 INPUT NAND
IC126		002-74200-32	(S) IC 74F32 "FAST" QUAD 2 INPUT OR GAT
IC127		002-00055-50	(S) IC LM555 TIMER
IC201		002-00012-47	(S) IC MC33078 DUAL OP AMP LO NOISE
IC202		002-00012-47	(S) IC MC33078 DUAL OP AMP LO NOISE
IC203		002-00012-47	(S) IC MC33078 DUAL OP AMP LO NOISE
IC204		002-00012-47	(S) IC MC33078 DUAL OP AMP LO NOISE
IC205		002-00012-25	(S) IC TL084 QUAD OP AMP JFET I/P
IC206		002-74200-00	(S) IC 74F00 "FAST" QUAD 2 INPUT NAND
IC207		002-74200-14	(S) IC 74F14 "FAST" HEX SCHMITT INVERTO
IC208		002-74207-40	(S) IC 74F74 DUAL D FLIP FLOP "FAST" DI
IC209		002-74001-25	(S) IC 74HC125 QUAD 3 STATE NON-INV BUF
IC210		002-00320-44	(S) IC TLC32044CN AUDIO INT-FCE 14BIT A
IC211		002-00320-44	(S) IC TLC32044CN AUDIO INT-FCE 14BIT A
IC212		002-74040-20	(S) IC 74HC4020 14 BIT BIN COUNTR DIL16
IC301		002-74202-45	(S) IC 74F245 "FAST" OCTAL TRI-STATE BU
IC302		002-00266-10	(S) IC SCN2661 PROG COMMUNICATIONS INTE
IC304		002-74202-44	(S) IC 74F244 "FAST" OCTAL TRI-STATE BU
IC305		002-74202-44	(S) IC 74F244 "FAST" OCTAL TRI-STATE BU
IC306		002-74203-73	(S) IC 74F373 OCTAL LATCH
IC307		002-74200-00	(S) IC 74F00 "FAST" QUAD 2 INPUT NAND
IC308		002-74200-14	(S) IC 74F14 "FAST" HEX SCHMITT INVERTO
IC309		002-74200-20	(S) IC 74F20 "FAST" DUAL 4 INPUT NAND
IC310		002-74200-32	(S) IC 74F32 "FAST" QUAD 2 INPUT OR GAT
IC313		002-74200-32	(S) IC 74F32 "FAST" QUAD 2 INPUT OR GAT
IC314		002-00015-40	(S) IC 4069UB UNBUFF HEX INVERTER
IC315		002-00021-01	(S) IC LTC485CN8 RS485 XCVR DIL-8
IC316		002-00152-20	(S) IC LH1522AB OPTO COUPLED RELAY 8DIP
IC317		002-00152-20	(S) IC LH1522AB OPTO COUPLED RELAY 8DIP
LEM		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
LINK1		240-00020-68	HEADER 2WAY PCB MTG STD
LINK3		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
L101		056-00022-04	IND FXD 470MH WOUND ON FE BEAD
L102		056-00022-04	IND FXD 470MH WOUND ON FE BEAD
L103		056-00022-05	IND FXD 150UH CHOKE (1 LYR 0.8MM WIRE/T9
PL1		240-00021-12	CONN 32 WAY RT ANGLE DIN41612 MALE
Q101		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q301		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q302		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q303		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q304		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q305		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q308		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q309		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q310		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
Q311		000-50011-10	(S) XSTR AI BC547B NPN TO-92 AF S/SIG
R33		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R34		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R105		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R106		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R107		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R108		030-53150-20	RES FILM AI 150E 5% 0.4W 4X1.6MM
R109		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R110		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R115		030-50000-20	RES AI ZERO OHM 4X1.6MM
R117		030-50000-20	RES AI ZERO OHM 4X1.6MM
R120		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R121		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R130		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R131		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R132		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R133		030-57100-20	RES FILM AI 1M 5% 0.4W 4X1.6MM
R134		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R135		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R136		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R137		030-52470-20	RES FILM AI 47E 5% 0.4W 4X1.6MM
R138		030-52470-20	RES FILM AI 47E 5% 0.4W 4X1.6MM
R139		030-52470-20	RES FILM AI 47E 5% 0.4W 4X1.6MM
R140		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R141		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R142		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R143		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R144		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R145		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R146		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R147		030-56470-20	RES FILM AI 470K 5% 0.4W 4X1.6MM
R148		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R149		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R150		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R151		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R152		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
RV201		042-05100-06	RES PRESET 10K CARBON 6MM FLAT
RV202		042-05100-06	RES PRESET 10K CARBON 6MM FLAT
RV203		042-05100-06	RES PRESET 10K CARBON 6MM FLAT
RV204		042-05100-06	RES PRESET 10K CARBON 6MM FLAT
RV205		042-05100-06	RES PRESET 10K CARBON 6MM FLAT
R206		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R208A		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R208B		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R209		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R210		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R211		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R212A		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R212B		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R214		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R215		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R220		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R221		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R222		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R223		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R224		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R225		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R226		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R227		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R228		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R229		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R230		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R231		030-55270-20	RES FILM AI 27K 5% 0.4W 4X1.6MM
R233		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R234		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R235		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R236		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R237		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R238		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R239		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R240		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R241		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R242		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R243		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R246		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R247		030-56150-20	RES FILM AI 150K 5% 0.4W 4X1.6MM

Ref	Var	IPN	Description
R249		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R250		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R251		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R252		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R253		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R254		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R255		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R256		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R257		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R258		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R259		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R260		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R261		030-55270-20	RES FILM AI 27K 5% 0.4W 4X1.6MM
R263		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R264		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R265		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R266		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R267		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R268		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R269		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R270		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R271		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R272		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R273		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R274		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R280		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R282		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R283		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R284		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R285		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R286		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R287		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R288		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R289		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R290		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R291		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R292		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R293		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R294		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R295		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R296		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R297		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R298		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R299		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R302		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R321		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R322		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R323		030-07100-00	RES FILM 1M 5% 0.25W 7X2.5MM
R324		030-53220-20	RES FILM AI 220E 5% 0.4W 4X1.6MM
R330		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R331		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R332		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R361		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R362		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R363		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R364		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R365		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R366		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R367		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R371		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R372		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R373		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R374		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R375		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R376		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R377		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R378		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R381		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R382		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R383		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R384		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R385		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R386		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R387		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R388		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R389		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R390		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R391		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R392		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R393		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R394		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R395		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R396		030-55470-20	RES FILM AI 47K 5% 0.4W 4X1.6MM
R397		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
RS485		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
S1		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
SW1		232-02026-00	*USE 232-02033-00 SW PUSH SPST VER NONLAT
S2		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S3		012-04100-06	CAP CER 1N 3-PIN SUPPR FLTR
S4		012-04100-06	CAP CER 1N 3-PIN SUPPR FLTR
S5		012-04100-06	CAP CER 1N 3-PIN SUPPR FLTR
S6		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S7		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S8		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S9		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S10		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S11		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S12		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S13		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S14		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
S15		012-03100-06	CAP CER 100P 3-PIN SUPPR FLTR
SW301		230-00010-19	SWITCH*8 SPST DIP PKG
SW302		230-00010-19	SWITCH*8 SPST DIP PKG
TSGM		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
TEST		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
WDR		008-00014-74	(S) LED HLMP5030 RED RT ANGLE PCB MTG
X301		274-00010-52	XTAL 4.9152MHZ HC49/U NR-18 HOLDER

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T805-02 Mechanical & Miscellaneous Parts (220-01253-01)

IPN	Description
220-01253-01	PCB T805-02 QUASI-SYNC DSP CARD
240-04020-44	SKT IC 28 MACHINED PINS LOW PROF For IC111 IC113 IC115 IC117 IC210 IC211 IC302
240-04020-49	SKT 68 PIN PLCC CHIP CARRIER For IC105
240-04020-62	SKT 2 WAY RECEPTL SHORTING LINK LINK1 LINK2 LINK3 LINK4 LINK5
308-13091-00	HSINK PCB MTG TO-220
322-10091-00	VERO HANDLE SUIT CARDS FOR UNIRACK SUBRACK
345-00030-09	SCREW M2.6*10MM PAN PHILIPS NI PLT Goes with PL1
345-00040-10	SCREW M3*6MM PAN POZI ST BZ Go on IC101 IC102
352-00010-05	NUT M2.6 MACH HEX ST NI PLATE Goes with PL1
352-00010-08	NUT M3 COLD FORM HEX ST BZ Go on IC101 IC102
353-00010-13	WASHER M3 SHAKEPROOF INT BZ Go on IC101 IC102
365-00011-41	LABEL STATIC WARNING A4A320 ORANGE
365-00011-54	LABEL WHITE RW1556/2 SPECIAL ADHESIVE
399-00010-89	BAG STATIC SHIELDING 254X356MM

IPN	Description

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T805-02 Grid Reference Index (IPN 220-01253-01)

How To Use This Grid Reference Index

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit
ARM	1:A2	3-P6
AIM	1:A1	3-P3
C103	1:G7	1-F8
C104	1:H7	1-I8
C105A	1:D8	1-D8
C105B	1:D9	1-D8
C105C	1:E10	1-D8
C105D	1:F9	1-E8
C106	1:G8	1-G6
C107	1:H8	1-B4
C109	1:J12	1-I7
C110	1:L12	1-I7
C111	1:B13	1-N9
C112	1:B10	1-O9
C113	1:D13	1-N7
C114	1:C10	1-O7
C115	1:F13	1-N4
C116	1:G10	1-O4
C117	1:H13	1-N2
C118	1:H10	1-O2
C120	1:J11	1-J7
C121	1:L11	1-K7
C122	1:L10	1-I5
C124	1:J8	1-I5
C125	1:L8	1-J5
C126	1:J10	1-K5
C127	1:C4	1-G3
C130	1:H7	1-B3
C131	1:H8	1-C3
C132	1:K9	1-C2
C134	1:C4	1-F2
C135	1:C3	1-H2
C136	1:B3	1-H2
C150	1:K7	1-A8
C151	1:J6	1-D8
C152	1:J7	1-C8
C153	1:L6	1-D8
C154	1:K6	1-E8
C155	1:G7	1-F8
C156	1:G7	1-G8
C157	1:F7	1-H8
C158	1:F7	1-I8
C159	1:H7	1-I8
C160	1:H7	1-J8
C161	1:G7	1-K8
C162	1:H7	1-L8
C163	1:K6	1-C9
C170	1:L6	1-A8
C171	1:J7	1-C8
C201A	1:K2	2-M6
C201B	1:L2	2-N6
C201C	1:K1	2-M5
C202A	1:J3	2-K9
C202B	1:H3	2-L9
C202C	1:J3	2-L9
C203A	1:L3	2-O6
C203B	1:L3	2-O6
C203C	1:K2	2-N5
C204A	1:G3	2-M9
C204B	1:G3	2-M9
C204C	1:G3	2-M9
C205A	1:H1	2-P6
C205B	1:H1	2-P6
C205C	1:J1	2-P5
C206	1:F6	2-N9
C207	1:H6	2-O9
C208	1:G2	2-P9
C209	1:F4	2-P9
C210A	1:F5	2-I9
C210B	1:F5	2-J9
C210C	1:F5	2-J9
C211A	1:J5	2-I4
C211B	1:J5	2-J4
C211C	1:J5	2-J4
C212	1:F2	2-M2
C220	1:L1	2-B9
C221	1:L1	2-B8
C222	1:L1	2-C8
C223	1:L2	2-D9
C224	1:L1	2-D9
C225	1:K1	2-E9
C226	1:K2	2-E9
C227	1:K2	2-F9
C230	1:J3	2-C7
C231	1:H3	2-C7
C232	1:J3	2-E7
C233	1:J2	2-E7
C234	1:H3	2-E6
C235	1:J3	2-E8
C236	1:K3	2-B5
C237	1:K3	2-B5
C238	1:K2	2-C5
C239	1:K3	2-D6
C240	1:K2	2-D5
C241	1:L2	2-E5
C242	1:L3	2-E6
C243	1:L3	2-F5
C245	1:G3	2-C4
C246	1:F3	2-C3
C247	1:G3	2-E4
C248	1:G2	2-E4
C249	1:F2	2-E2
C250	1:H3	2-E4
C251	1:J2	2-C2
C252	1:G2	2-C1
C253	1:H2	2-E2
C254	1:J2	2-C1
C255	1:J2	2-C0
C256	1:G1	2-D1
C257	1:J1	2-D0
C258	1:J2	2-E1
C259	1:G1	2-G0
C260	1:J1	2-G0
C261	1:J1	2-H1
C262	1:J1	2-I0
C285	1:G2	2-O2
C286	1:F2	2-P2
C287	1:G2	2-P2
C289	1:F5	2-I8
C290	1:J5	2-I3
C301	1:C8	3-C9
C302	1:B8	3-F9
C304	1:D4	3-K9
C305	1:D2	3-K5
C306	1:C2	3-M2
C307	1:F8	3-H2
C308	1:D6	3-I2
C309	1:E6	3-J2
C310	1:D8	3-H1
C313	1:B6	3-I1
C314	1:B4	3-J1
C315	1:B6	3-J9
C321	1:A4	3-G5
C322	1:A4	3-H5
DIGOUT	1:A5	3-D1
D101	1:F6	1-H9
D102	1:G6	1-K9
D103	1:K7	1-C8
D104	1:J7	1-D8
D106	1:H8	1-B8
D107	1:H9	1-B8
D108	1:J9	1-B7
D109	1:J8	1-B7
D110	1:H8	1-C2
D111	1:K8	1-C2
D112	1:B4	1-F2
D113	1:H8	1-B2
D114	1:K8	1-E2
D115	1:B7	1-E2
D116	1:K6	1-C9
D201	1:F6	2-I9
D202	1:F5	2-I9
D203	1:J6	2-I4
D204	1:J5	2-I4
D207	1:H5	2-G9
D210	1:H6	2-H9
D216	1:J4	2-H5
D220	1:H4	2-H7
D221	1:H4	2-H7
D223	1:K4	2-H4
D301	1:B3	3-P8
D302	1:B2	3-P7
D303	1:B2	3-P6
D304	1:B1	3-P4
HS101	1:J6	1-B9
HS102	1:L6	1-E9
IC101	1:J6	1-B8
IC102	1:L6	1-E8
IC103	1:F7	1-G8
IC104	1:G7	1-J8
IC105	1:E9	1-E3
IC106	1:G7	1-G5
IC107	1:H8	1-B3
IC108	1:K7	1-G3
IC109	1:J12	1-H6
		1-D1
IC110	1:K12	1-I6
		1-H1
		1-J1
IC111	1:A12	1-M7
IC112	1:A10	1-O7
IC113	1:C12	1-M5
IC114	1:C10	1-O5
IC115	1:E12	1-M3
IC116	1:F10	1-O3
IC117	1:G12	1-M0
IC118	1:H10	1-O0
IC120	1:J11	1-J6
		1-B2
		1-D2
		1-E2
		1-F3
IC121	1:K11	1-K6
		1-C1
		1-E1
		1-G1
		1-L3
IC122	1:K9	1-H5
		1-K4
		1-K3
		1-K3
		1-K3
IC124	1:J8	1-I5
		1-C7
		1-F2
		1-E4
		1-D2
		1-D3
		1-C7
IC125	1:K8	1-J5
		1-I1
		1-K1
IC126	1:J9	1-K5
		1-L5
		1-L0
		2-K1
		3-O0
IC127	1:B4	1-G2
IC201	1:K2	2-M6
		2-D9
		2-E9
IC202	1:H3	2-K9
		2-D7
		2-D6
IC203	1:K3	2-N6
		2-D5
		2-E5
IC204	1:G3	2-L9
		2-D3
		2-D3
IC205	1:H2	2-P6
		2-E2
		2-E0
		2-F1
		2-H0
IC206	1:F6	2-N9
		2-M7
		2-N4
		2-N3
		2-N1

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Device	PCB	Circuit
IC207	1:H6	2-O9
		2-K0
		2-O4
		2-O3
		2-P1
		2-P0
		2-N1
IC208	1:G2	2-O9
		2-N1
		2-N7
IC209	1:F4	2-P9
		2-K7
		2-K3
		2-P1
		2-P0
IC210	1:G6	2-I6
IC211	1:J6	2-I2
IC212	1:F2	2-L0
IC301	1:C8	3-D7
IC302	1:A8	3-E6
IC304	1:C4	3-L7
IC305	1:C2	3-L4
IC306	1:B2	3-M1
IC307	1:E8	3-H2
		3-B4
		3-N0
		3-N0
		3-M9
IC308	1:C6	3-I2
		3-D5
		3-D3
		3-F3
		3-I7
		3-M9
		3-B4
IC309	1:E6	3-J2
		3-F3
		3-F0
IC310	1:D8	3-H1
		3-C4
		3-G3
		3-G0
		3-M9
IC313	1:A6	3-I1
		3-C4
		3-G7
		3-H7
		3-O0
IC314	1:A4	3-J1
		3-G7
		3-G6
		3-I4
		3-H4
		3-H4
		3-I4
IC315	1:B6	3-I8
IC316	1:K4	3-P1
		3-P1
		2-B7
		2-B7
IC317	1:K5	3-P0
		3-P0
		2-B4
		2-B3
LEM	1:A2	3-P7
LINK1	1:K8	1-C3
		1-C3
		1-F7
LINK3	1:H2	2-B2
		2-C2
		2-B2
		2-B1
L101	1:G6	1-H8
L102	1:H6	1-K8
L103	1:L7	1-C8
PL1	1:L5	1-A7

Device	PCB	Circuit
		1-F7
		2-A1
		2-A2
		2-A3
		2-A4
		2-A5
		2-A7
		2-A8
		2-A9
		3-A2
		3-A0
		3-A1
		3-A2
		3-A8
		3-A9
		3-J8
Q101	1:B8	1-E3
Q301	1:B3	3-P8
Q302	1:B2	3-P7
Q303	1:B2	3-P6
Q304	1:B1	3-P5
Q305	1:B1	3-P2
Q308	1:B1	3-P3
Q309	1:B5	3-D0
Q310	1:B5	3-I7
Q311	1:D3	3-B0
R33	1:B5	3-I8
R34	1:A6	3-I8
R105	1:F9	1-C8
R106	1:E8	1-E8
R107	1:H8	1-C3
R108	1:K7	1-G4
R109	1:K7	1-G3
R110	1:L11	1-D1
R115	1:D11	1-M5
R117	1:J9	1-N0
R120	1:K8	1-I2
R121	1:L8	1-K2
R130	1:H7	1-B4
R131	1:H7	1-B4
R132	1:H8	1-C2
R133	1:K8	1-C2
R134	1:L11	1-C1
R135	1:L7	1-A7
R136	1:K3	1-A7
R137	1:K10	1-B5
R138	1:K9	1-B5
R139	1:D8	1-C5
R140	1:F10	1-C4
R141	1:E8	1-C4
R142	1:K10	1-E1
R143	1:C8	1-E3
R144	1:B4	1-F2
R145	1:A6	1-E4
R146	1:K11	1-G1
R147	1:C3	1-H2
R148	1:K10	1-F4
R149	1:B4	1-F2
R150	1:J10	1-B3
R151	1:B7	1-E2
R152	1:K6	1-C9
RV201	1:K1	2-D9
RV202	1:J2	2-E7
RV203	1:L2	2-D5
RV204	1:H2	2-E4
RV205	1:H1	2-G0
R206	1:E6	2-M8
R208A	1:F1	2-N2
R208B	1:G1	2-N8
R209	1:E4	2-L3
R210	1:F4	2-I7
R211	1:J4	2-I2
R212A	1:F1	2-L1
R212B	1:F1	2-L1
R214	1:H8	1-B7
R215	1:J8	1-B7

Device	PCB	Circuit
R220	1:L2	2-B9
R221	1:L2	2-C9
R222	1:L1	2-C8
R223	1:L2	2-C9
R224	1:L1	2-C8
R225	1:L1	2-C8
R226	1:L1	2-D9
R227	1:L1	2-D9
R228	1:L2	2-D8
R229	1:K1	2-E8
R230	1:K1	2-E9
R231	1:K1	2-E9
R233	1:H1	2-G0
R234	1:J1	2-H0
R235	1:J3	2-C7
R236	1:H3	2-C7
R237	1:J3	2-C7
R238	1:H3	2-C6
R239	1:J3	2-C7
R240	1:H3	2-C6
R241	1:H3	2-D7
R242	1:H2	2-D8
R243	1:J2	2-D7
R246	1:H2	2-E6
R247	1:J1	2-H0
R249	1:J1	2-H0
R250	1:K3	2-B5
R251	1:K3	2-C5
R252	1:K2	2-C5
R253	1:K3	2-C5
R254	1:K2	2-C5
R255	1:K2	2-C5
R256	1:K3	2-D5
R257	1:K3	2-D6
R258	1:K3	2-D5
R259	1:L2	2-E5
R260	1:L2	2-E5
R261	1:L2	2-E5
R263	1:F2	2-P2
R264	1:H3	2-P2
R265	1:G3	2-C4
R266	1:G3	2-C3
R267	1:G3	2-C3
R268	1:G3	2-C3
R269	1:G3	2-C4
R270	1:F3	2-C2
R271	1:F3	2-D3
R272	1:G2	2-D3
R273	1:G2	2-D4
R274	1:G3	2-E2
R280	1:H2	2-B1
R282	1:H2	2-C1
R283	1:J2	2-B0
R284	1:H1	2-C2
R285	1:H1	2-D2
R286	1:G2	2-C1
R287	1:G2	2-D1
R288	1:H2	2-E2
R289	1:H1	2-E1
R290	1:J2	2-C0
R291	1:J2	2-D1
R292	1:J2	2-C0
R293	1:J1	2-D0
R294	1:G1	2-D1
R295	1:J1	2-D0
R296	1:J2	2-E0
R297	1:J1	2-E1
R298	1:H1	2-F1
R299	1:H1	2-F0
R302	1:B7	3-G9
R321	1:B7	3-G9
R322	1:B6	3-G9
R323	1:A4	3-G7
R324	1:A4	3-G6
R330	1:C3	3-B0
R331	1:B2	3-C0

Device	PCB	Circuit
R332	1:A6	3-D1
R361	1:D4	3-N8
R362	1:D4	3-N8
R363	1:D4	3-N8
R364	1:D3	3-N8
R365	1:D3	3-N8
R366	1:D3	3-N8
R367	1:D3	3-N7
R371	1:D2	3-N5
R372	1:D2	3-N5
R373	1:D2	3-N5
R374	1:D2	3-N4
R375	1:D1	3-N4
R376	1:D1	3-N4
R377	1:D1	3-N4
R378	1:D1	3-N4
R381	1:B3	3-P8
R382	1:A3	3-P9
R383	1:B2	3-P7
R384	1:A2	3-P8
R385	1:B2	3-P6
R386	1:A2	3-P6
R387	1:B1	3-P5
R388	1:A1	3-P5
R389	1:B1	3-P2
R390	1:A1	3-P3
R391	1:K3	3-P1
R392	1:K3	3-P1
R393	1:K4	3-P0
R394	1:K4	3-P0
R395	1:B1	3-P4
R396	1:B2	3-Q3
R397	1:B1	3-P3
RS485	1:A5	3-I7
S1	1:L4	2-B9
S2	1:L4	2-B8
S3	1:L5	2-B7
S4	1:L5	2-B6
S5	1:L4	2-B5
S6	1:L4	2-B5
S7	1:L5	2-B3
S8	1:L5	2-B3
S9	1:L4	2-B2
S10	1:L3	2-B1
S11	1:L3	2-B1
S12	1:L3	2-B0
S13	1:L4	3-B2
S14	1:L4	3-C2
S15	1:L4	3-C1
SW1	1:A12	1-C2
SW301	1:E4	3-M7
SW302	1:E2	3-M4
TESTMODE	1:A3	3-P9
TSGM	1:A1	3-P5
TP1	4:J7	1-A4
TP2	4:H6	1-F4
TP3	4:B7	1-G4
TP4	4:J10	1-B2
TP5	4:D8	1-C5
TP8	4:L3	2-B9
TP9	4:L3	2-B8
TP10	4:L2	2-D9
TP11	4:K2	2-E9
TP12	4:K2	2-F9
TP13	4:H5	2-H8
TP14	4:K5	2-B7
TP15	4:K4	2-B7
TP16	4:J3	2-C7
TP17	4:H2	2-C7
TP18	4:J2	2-E8
TP19	4:H4	2-H8
TP20	4:K3	2-B5
TP21	4:K3	2-B5
TP22	4:K3	2-D5
TP23	4:L3	2-E6
TP24	4:L2	2-F6

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Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
TP25	4:J3	2-H7									
TP26	4:L5	2-B4									
TP27	4:K5	2-B3									
TP28	4:G3	2-C4									
TP29	4:F3	2-C3									
TP30	4:G2	2-E4									
TP31	4:K5	2-H4									
TP32	4:H2	2-B2									
TP33	4:G2	2-B1									
TP34	4:H2	2-E2									
TP35	4:H1	2-F1									
TP36	4:J2	2-B0									
TP37	4:K2	2-B0									
TP38	4:J2	2-E0									
TP39	4:K5	2-H3									
TP40	4:J5	2-P8									
TP41	4:D5	2-P7									
TP42	4:E3	2-O7									
TP43	4:D9	2-O7									
TP44	4:D8	2-P7									
TP45	4:D9	2-P4									
TP46	4:G8	2-P3									
TP47	4:G5	2-O3									
TP48	4:F2	2-M1									
TP49	4:F4	2-N1									
TP50	4:H6	2-O1									
WDR	1:A5	1-E3									
X301	1:A4	3-G6									

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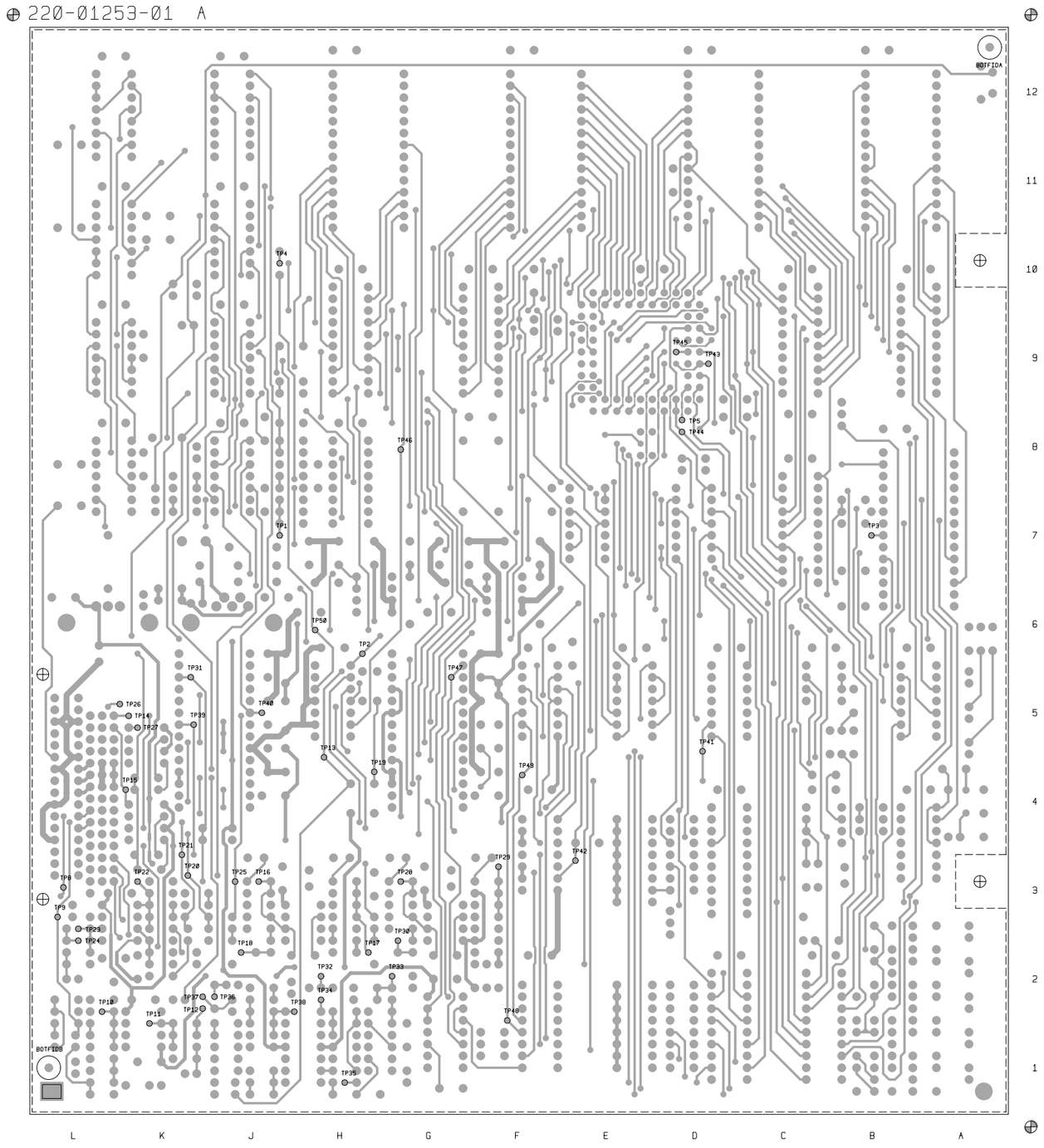

T805-02 PCB Layout - Bottom Side
220-01253-01

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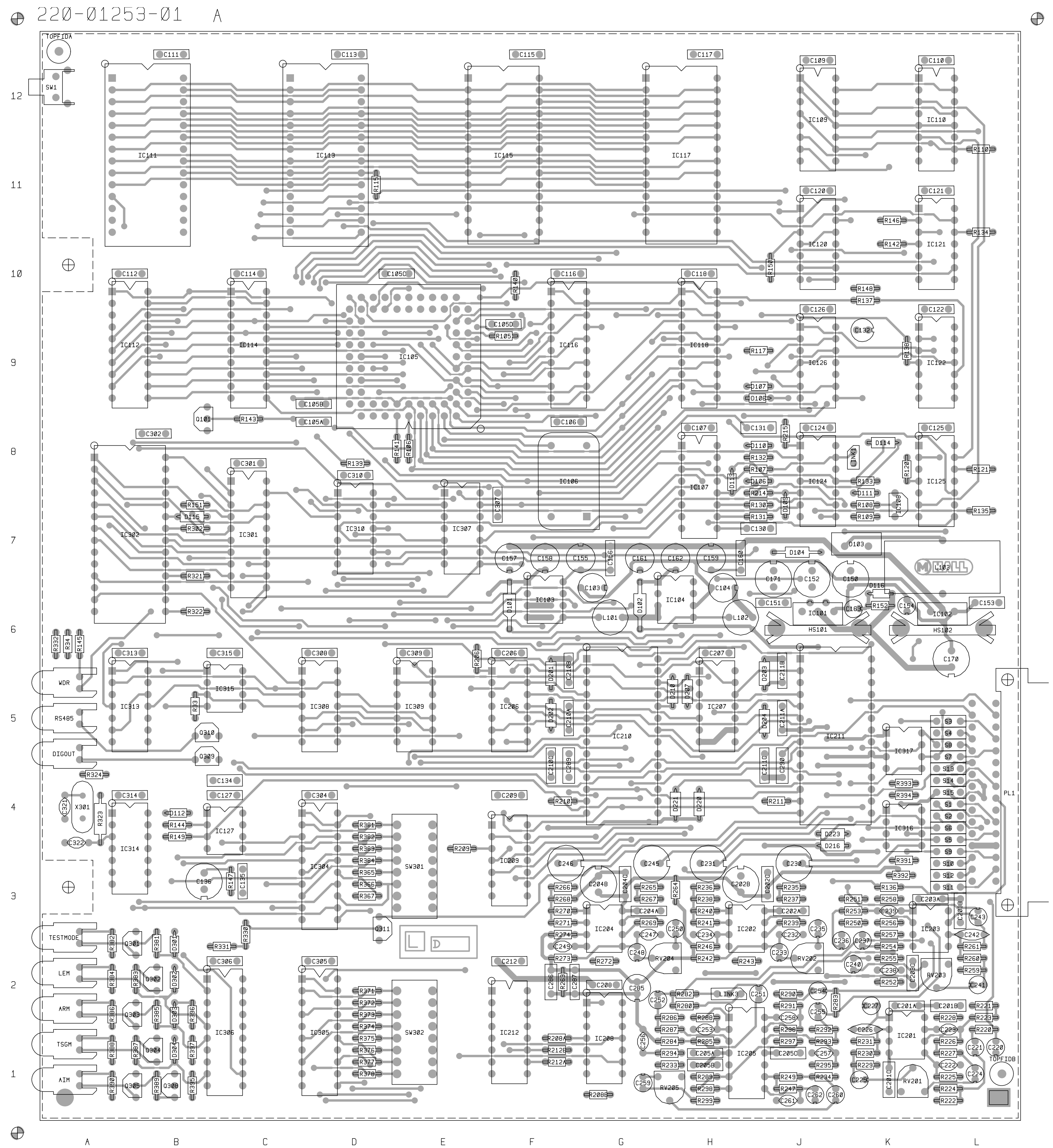

T805-02 PCB Layout - Top Side - 220-01253-01

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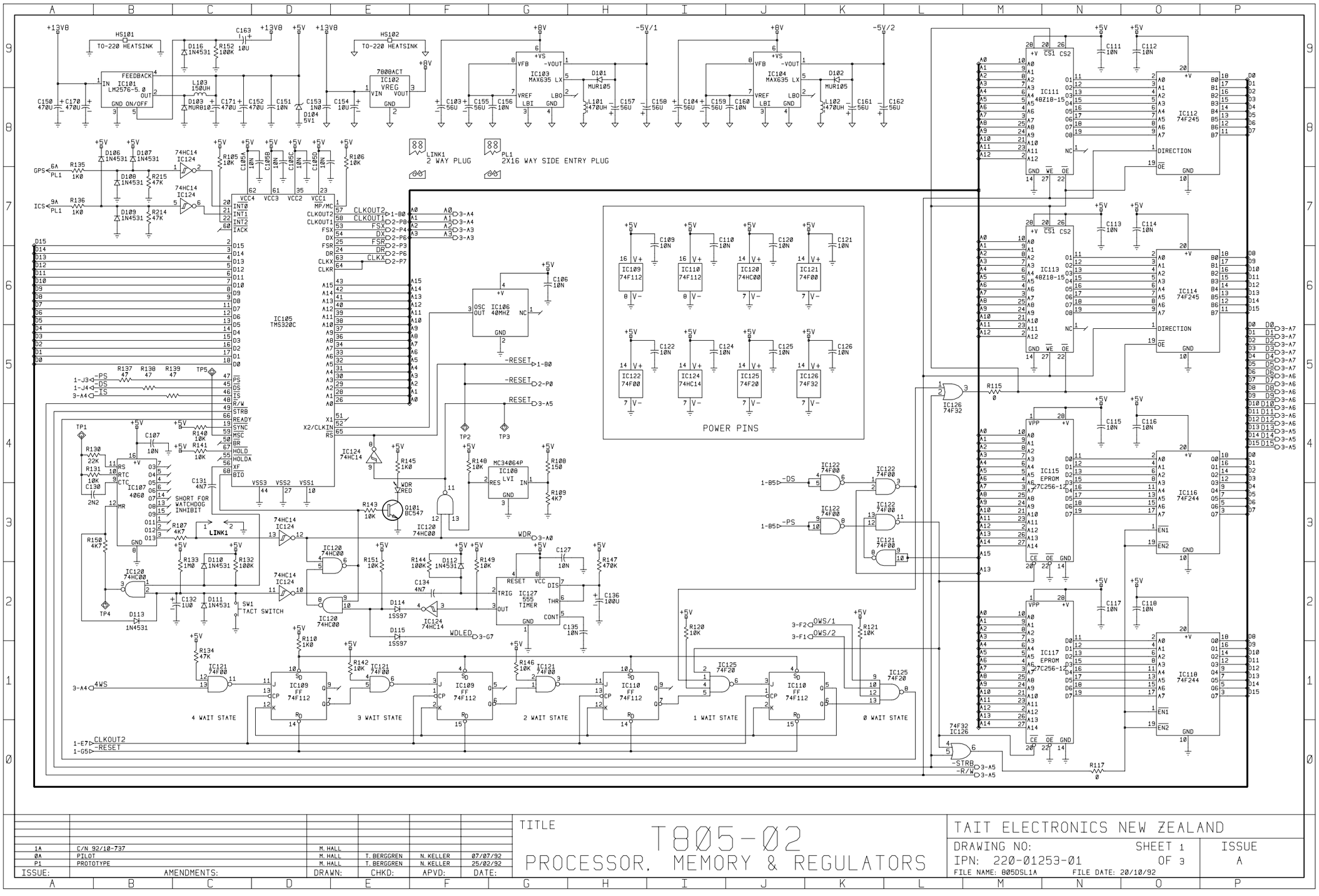

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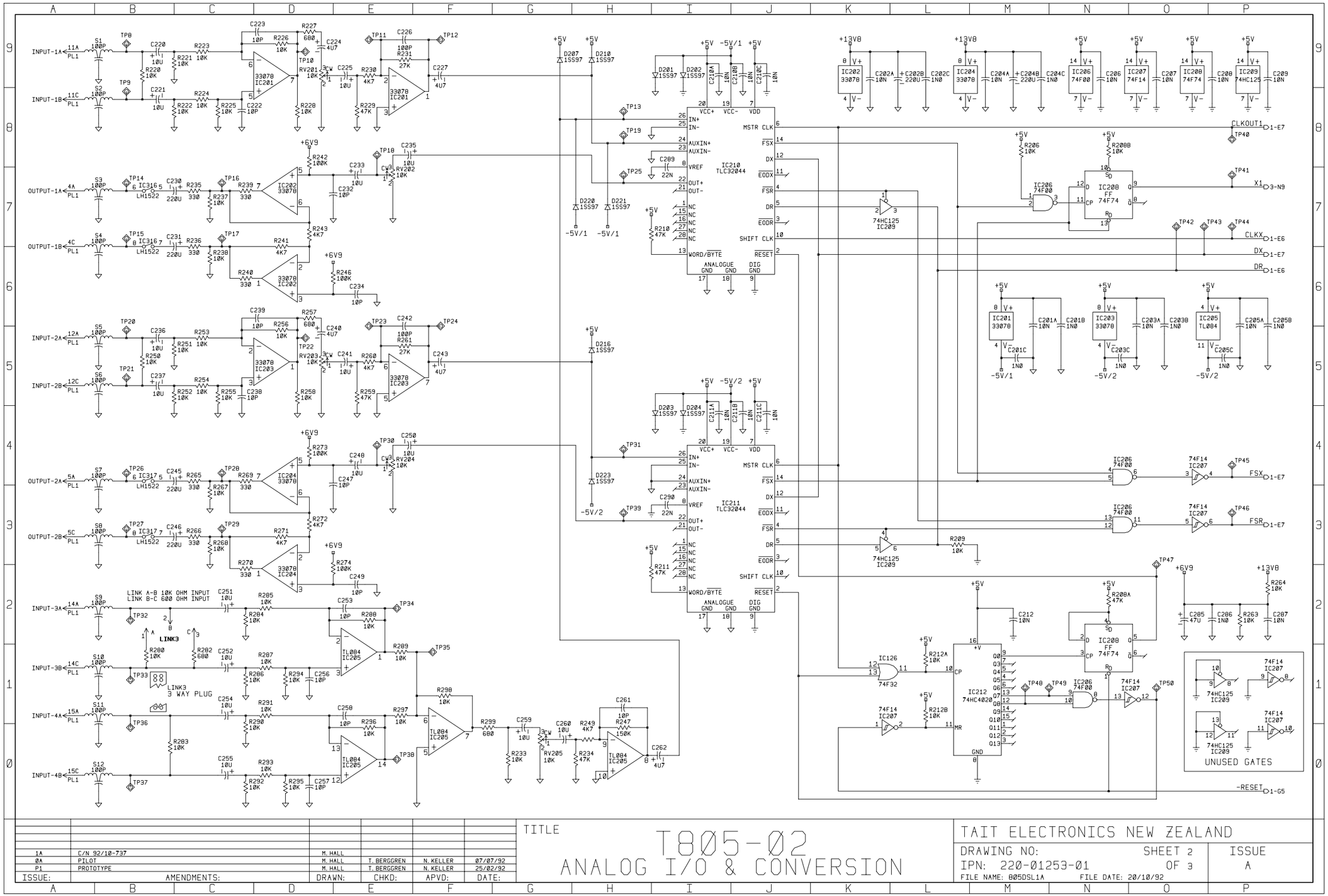

T805-02 Analogue I/O & Conversion - 220-01253-01

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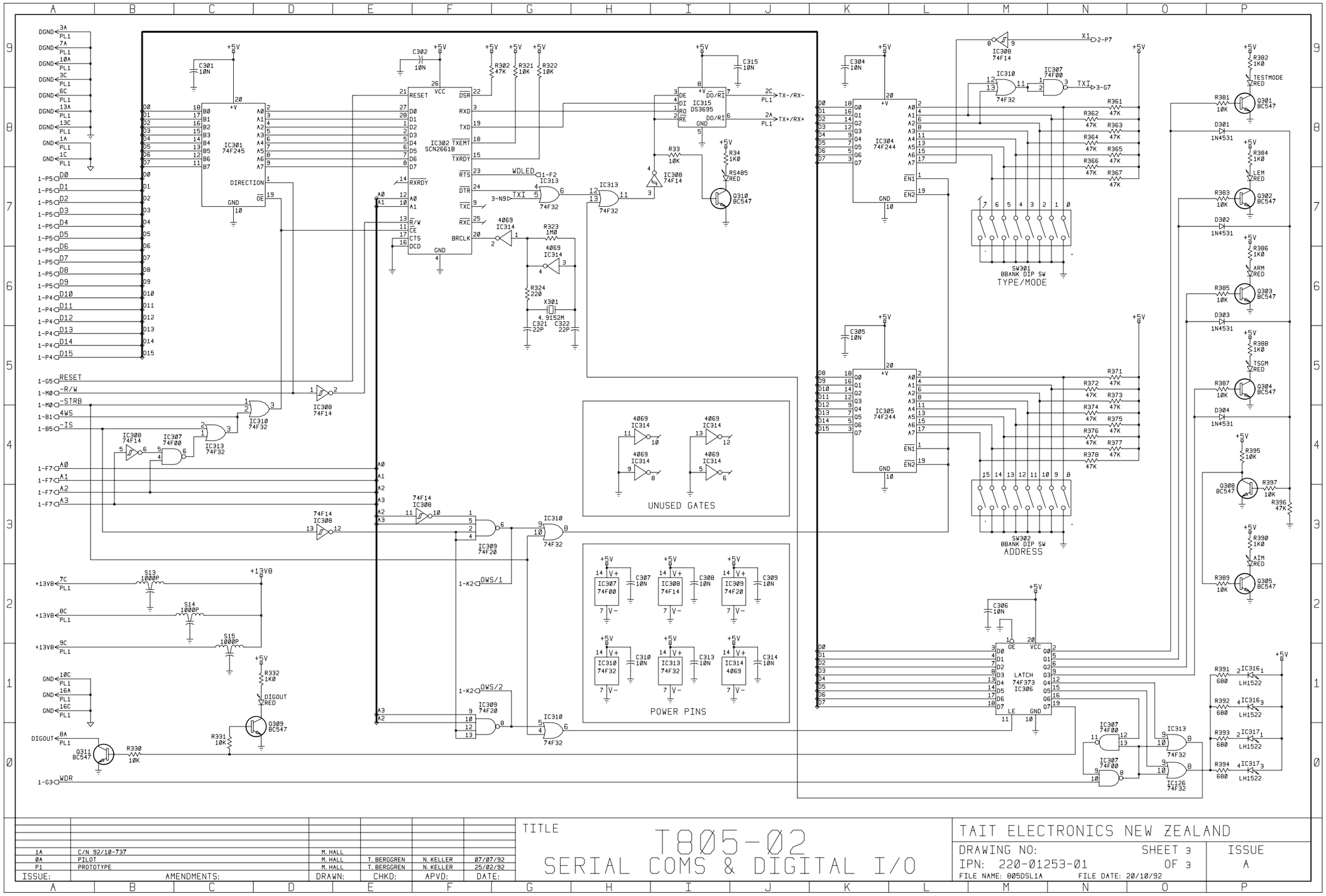

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14.3 T805-04 Backplane PCB

This section contains the following information.

T805-04 Parts List (IPN 220-01254-02)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped by component type in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

Add: 365-01399-00 label QS BABT approval (93/09-479)

Ref	Var	IPN	Description
C6		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C9		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C10		020-58100-04	CAP ELECT AI RDL 10M 16V 4X7MM
C11		020-58100-04	CAP ELECT AI RDL 10M 16V 4X7MM
C12		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C13		021-19100-01	CAP ELECT AXIAL 1000M 16V 12.5*25MM
C14		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C15		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C16		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C17		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C18		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C19		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C20		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C21		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C22		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C23		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C24		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C25		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C26		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C27		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C28		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C29		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C30		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C31		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C32		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C33		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C34		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C35		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C36		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C37		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C38		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C39		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C40		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C41		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C42		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C43		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C44		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C45		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C46		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C47		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C48		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C49		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C50		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C51		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C52		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C53		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C54		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C55		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C56		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C57		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C58		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C59		020-08470-02	CAP ELECT RADL 47M 16V 6X11MM
C60		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C61		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C62		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C63		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C64		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C65		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C66		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C67		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C68		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C69		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C70		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C71		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
CN1-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN1-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN1-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN2-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN2-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN2-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN3-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN3-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN3-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN4-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN4-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN4-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN5-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN5-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN5-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN6-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN6-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN6-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN7-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN7-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN7-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN8-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN8-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN8-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN9-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN9-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PIT
CN9-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN10		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
D1		001-00012-77	(S) DIODE 1N6277A ZENER 18V 1500W @ 1.0MS
D2		001-00011-05	(S) DIODE MUR105 ULTRA FAST 50V 1AMP
D3		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO M
D4		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO M
D5		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO M
D6		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO M
D7		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO M
D8		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO M
D9		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO M
D10		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO
D11		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO
D12		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D13		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
IC1		002-00012-25	(S) IC TL084 QUAD OP AMP JFET I/P
IC2		002-00012-25	(S) IC TL084 QUAD OP AMP JFET I/P
IC3		002-00012-25	(S) IC TL084 QUAD OP AMP JFET I/P
IC4		002-00021-01	(S) IC LTC485CN8 RS485 XCVR DIL-8
IC5		002-00021-01	(S) IC LTC485CN8 RS485 XCVR DIL-8
IC6		002-74000-14	(S) IC 74HC14 HEX SCHMITT TRIG INVERTR
IC7		002-00063-50	(S) IC MAX635 -5V INVERTING REGULATOR
LED1		008-00015-02	(S) LED RED COMPL WITH SATEN CHROME BEZE
L1		056-00022-04	IND FXD 470MH WOUND ON FE BEAD
L3-10A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG

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Ref	Var	IPN	Description
L3-10B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
L4-10A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
L4-10B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK1-1		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK1-2		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-0A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-0B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-1		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-2		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-3		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-3A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-3B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-4		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-4A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-4B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-5		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-5A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-5B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-6		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-6A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-6B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-7		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-7A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-7B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-8		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-8A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-8B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-9		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-9A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-9B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-0A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-0B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-3A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-3B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-4A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-4B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-5A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-5B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-6A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-6B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-7A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-7B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-8A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-8B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-9A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-9B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK4-0A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK4-0B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-0		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK7A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK7B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK7C		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
PL1		240-00025-37	CONN MALE 34 WAY IDC
PL2		240-02010-85	SKT 9 WAY PCB MOUNT STRAIGHT
PL3		240-00025-37	CONN MALE 34 WAY IDC
PL10		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL11		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL12		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL13		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL14		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL15		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL16		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
R0		030-50000-20	RES AI ZERO OHM 4X1.6MM
REG1		002-00780-53	(S) IC MC78T05CT 5V REGULATOR 3AMP TO-22
R1		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
REG2		002-00780-53	(S) IC MC78T05CT 5V REGULATOR 3AMP TO-22
R2		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
REG3		002-00078-08	(S) IC MC7808ACT 8V REG(LINEAR)1AMP TO-2
R3		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R4		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R5		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R6		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R7		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R8		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R9		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R10		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R11		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R12		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R13		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R14		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM

Ref	Var	IPN	Description
R15		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R16		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R17		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R18		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R19		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R20		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R21		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R22		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R28		030-52560-20	RES FILM AI 56E 5% 0.4W 4X1.6MM
R30		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R40		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R41		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R42		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R43		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R44		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R45		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R46		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R47		030-55120-20	RES FILM AI 12K 5% 0.4W 4X1.6MM
R48		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R49		030-54120-20	RES FILM AI 1K2 5% 0.4W 4X1.6MM
R50		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R51		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R52		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R53		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R54		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R55		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R56		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R57		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R58		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R59		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R60		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R61		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R62		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R63		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R64		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R65		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R66		030-55120-20	RES FILM AI 12K 5% 0.4W 4X1.6MM
R67		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R68		030-54120-20	RES FILM AI 1K2 5% 0.4W 4X1.6MM
R69		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R70		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R71		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R72		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R73		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R74		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R75		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R76		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R77		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R78		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R79		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R80		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R81		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R82		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R83		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R84		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R85		030-55120-20	RES FILM AI 12K 5% 0.4W 4X1.6MM
R86		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R87		030-54120-20	RES FILM AI 1K2 5% 0.4W 4X1.6MM
R88		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R89		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R90		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R91		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R92		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R93		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R94		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R95		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R96		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R97		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R98		030-52560-20	RES FILM AI 56E 5% 0.4W 4X1.6MM
R99		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R100		030-52560-20	RES FILM AI 56E 5% 0.4W 4X1.6MM
R101		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R102		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R103		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R104		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R105		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R106		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R107		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R108		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R109		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R110		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
SW1		230-00010-24	SWITCH ROCKER SPST 250V 16A PNL MTG ILLU
SK1		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW2		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK2		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW3		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK3		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW4		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK4		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW5		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK5		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW6		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK6		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW7		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK7		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW8		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK8		240-02010-81	CONN 32 WAY DIN 41612 FEMALE

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Ref	Var	IPN	Description
SW9		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK9		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SW10		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SK10		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK11		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK12		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK13		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK14		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK15		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK16		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG

Ref	Var	IPN	Description

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T805-04 Mechanical & Miscellaneous Parts (220-01254-02)

IPN	Description
201-00030-04	WIRE #1 T/C WIRE 7/0.2MM PVC YELLOW
201-00030-10	WIRE #1 T/C WIRE 7/0.2MM PVC BLACK
201-00050-02	CABLE AUTO 148 RED 23/0.2MM PVC
205-00010-22	CABLE FLAT RBBN 34 CORE 28AWG GREY
220-01254-02	PCB T805-04 QUASI-SYNC RACK FRAME
240-04020-62	SKT 2 WAY RECEPTL SHORTING LINK LK1 LK2 LK3 LK4 LK5 LK6 LK7
265-00010-08	FUSE 15A CARTRIDGE 6*32MM BS4265 FUSE1
303-23129-00	COVER SET OF TOP AND BOTTOM FOR 19IN RACK AS
316-06468-02	PNL A1M2787/2 FRT SCRN T805-04 COMPL
319-01169-00	STRIP TAPPED 84E ACCESSORY FOR 19IN RACK ASS
319-30054-00	SPACER INSULATOR 42E (PKT OF 12) 19IN RACK A
322-10090-00	SUB RACK 6U X 84E GOUGH 100620
322-10092-00	VERO BAG OF 10 X CARD & MODULE GUIDE FOR 19"
340-00010-06	FUSE CLIP PCB MTG 6.3MM CARTRIDGE FUSE
345-00030-04	SCREW M2.6*8MM PAN PHILIPS NI PLT
345-00040-10	SCREW M3*6MM PAN POZI ST BZ
349-00010-30	SCREW M2.5*10 CHEESE HEAD SLOT B2 SCREW
352-00010-05	NUT M2.6 MACH HEX ST NI PLATE
352-00010-08	NUT M3 COLD FORM HEX ST BZ
353-00010-03	WASHER M2.5/M2.6 FLAT ST BZ
353-00010-13	WASHER M3 SHAKEPROOF INT BZ
356-00020-06	RECEPTL 6.3MM QUICK CONNECT FLARED INSULATE
365-00011-41	LABEL STATIC WARNING A4A320 ORANGE
365-01370-00	LABEL WARNING T805-04 BS6328 CLAUSE 8.1
369-00010-14	TIE CABLE NYLON 100*2.6MM
369-00010-24	BASE CABLE TIE MTG SELF ADHESIVE
400-00020-05	SLEEVING 1.5MM SIL RUBBER
410-01091-00	PKG A3M2805 T1560 POLYST FOAM (6 PIECES)
410-01092-00	CTN T1560 551 X 371 X 316MM
800-00000-47	CLIP CABLE CLAMP SELF ADHESIVE FOR 20 WAY RB

IPN	Description

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T805-04 Grid Reference Index (IPN 220-01254-02)

How To Use This Grid Reference Index

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C6	1:U9	2-K2	C69	1:J9	2-N0			1-U7	LK2-4A	1:P4	1-K7
C9	1:N9	2-T7	C70	1:K9	2-P0	CN9-3	1:A6	1-U4	LK2-4B	1:P4	1-K7
C10	1:N10	2-U7	C71	1:K9	2-P0			1-U4	LK2-5	1:M3	1-L8
C11	1:P10	2-V7	CN1-1	1:W4	1-E9			1-U2	LK2-5A	1:M4	1-M7
C12	1:P9	2-V7			1-E8	CN9-4	1:A5	1-U0	LK2-5B	1:M4	1-M7
C13	1:B2	2-T8			1-E7	CN10	1:D1	2-W8	LK2-6	1:J3	1-N8
C14	1:B2	2-T8	CN1-3	1:W6	1-E4	D1	1:A1	2-V8	LK2-6A	1:J4	1-O7
C15	1:B2	2-U8			1-E4	D2	1:K9	2-O0	LK2-6B	1:J4	1-O7
C16	1:F12	2-B6			1-E2	D3		1-D2	LK2-7	1:G3	1-P8
C17	1:F13	2-B5	CN1-4	1:W5	1-E0	D4		1-C2	LK2-7A	1:G4	1-Q7
C18	1:E13	2-C5	CN2-1	1:T4	1-G9	D5		1-B1	LK2-7B	1:G4	1-Q7
C19	1:E12	2-C6			1-G8	D6		1-D1	LK2-8	1:D3	1-R8
C20	1:D12	2-D6			1-G7	D7		1-C1	LK2-8A	1:D4	1-S7
C21	1:D13	2-D5	CN2-3	1:T6	1-G4	D8		1-B1	LK2-8B	1:D4	1-S7
C22	1:D13	2-E5			1-G4	D9		1-D0	LK2-9	1:B3	1-T8
C23	1:D12	2-F6			1-G2	D10		1-C0	LK2-9A	1:B4	1-U7
C24	1:C13	2-F5	CN2-4	1:T5	1-G0	D11		1-B0	LK2-9B	1:B4	1-U7
C25	1:D13	2-E4	CN3-1	1:R4	1-I9	D12	1:U8	2-D3	LK3-0A	1:W11	1-B6
C26	1:D13	2-B4			1-I8	D13	1:U8	2-D3	LK3-0B	1:W10	1-B6
C27	1:E13	2-C4			1-I7	FUSE1	1:C1	2-V8	LK3-1A	1:W3	1-D7
C28	1:E13	2-C4	CN3-3	1:R6	1-I4	IC1	1:E13	2-B5	LK3-1B	1:X3	1-D6
C29	1:F9	2-R6			1-I4			2-C6	LK3-2A	1:U3	1-F7
C30	1:F9	2-R5			1-I2			2-E5	LK3-2B	1:U3	1-F6
C31	1:E10	2-S5	CN3-4	1:R5	1-I0			2-E5	LK3-3A	1:R3	1-H7
C32	1:E9	2-S6	CN4-1	1:N4	1-K9			2-D5	LK3-3B	1:S3	1-H6
C33	1:D9	2-T6			1-K8	IC2	1:E11	2-J5	LK3-4A	1:P3	1-J7
C34	1:D9	2-T5			1-K7			2-K6	LK3-4B	1:P3	1-J6
C35	1:D10	2-U5	CN4-3	1:N6	1-K4			2-M5	LK3-5A	1:M3	1-L7
C36	1:D9	2-V6			1-K4			2-M5	LK3-5B	1:M3	1-L6
C37	1:C10	2-V5			1-K2			2-L5	LK3-6A	1:J3	1-N7
C38	1:D10	2-U4	CN4-4	1:N5	1-K0	IC3	1:E9	2-R5	LK3-6B	1:K3	1-N6
C39	1:D10	2-R4	CN5-1	1:L4	1-M9			2-S6	LK3-7A	1:G3	1-P7
C40	1:E10	2-S4			1-M8			2-U5	LK3-7B	1:G3	1-P6
C41	1:E10	2-R4			1-M7			2-U5	LK3-8A	1:D3	1-R7
C42	1:F11	2-J6	CN5-3	1:L6	1-M4			2-S5	LK3-8B	1:E3	1-R6
C43	1:F11	2-J5			1-M4	IC4	1:U10	2-B2	LK3-9A	1:B3	1-T7
C44	1:E11	2-K5			1-M2	IC5	1:U10	2-G2	LK3-9B	1:B3	1-T6
C45	1:E11	2-K6	CN5-4	1:L5	1-M0	IC6	1:U9	2-J2	LK3-10A	1:F11	2-I6
C46	1:D11	2-L6	CN6-1	1:J4	1-O9			2-C3	LK3-10B	1:F11	2-I5
C47	1:D11	2-L5			1-O8			2-C3	LK4-0A	1:W10	1-B5
C48	1:D11	2-M5			1-O7			2-R0	LK4-0B	1:W9	1-B5
C49	1:D11	2-N6	CN6-3	1:J6	1-O4			2-D3	LK4-10A	1:F9	2-Q6
C50	1:C11	2-N5			1-O4			2-R0	LK4-10B	1:F10	2-Q5
C51	1:D11	2-M4			1-O2			2-D3	LK5-1A	1:W6	1-D5
C52	1:D11	2-J4	CN6-4	1:J5	1-O0	IC7	1:K9	2-N0	LK5-1B	1:X3	1-D4
C53	1:E11	2-K4	CN7-1	1:F4	1-Q9	LED1		2-U7	LK5-2A	1:U6	1-F5
C54	1:E12	2-J4			1-Q8	L1	1:L9	2-O0	LK5-2B	1:V3	1-F4
C55	1:U10	2-A3			1-Q7	LK1-1	1:X3	1-E9	LK6-0	1:U9	2-C3
C56	1:U10	2-B3	CN7-3	1:F6	1-Q4	LK1-2	1:V3	1-E8	LK6-1A	1:W5	1-D4
C57	1:T10	2-H3			1-Q4	LK2-0A	1:W12	1-B7	LK6-1B	1:W5	1-D3
C58	1:T10	2-H3			1-Q2	LK2-0B	1:W11	1-B7	LK6-2A	1:U5	1-F4
C59	1:M10	2-J0	CN7-4	1:F5	1-Q0	LK2-1	1:W3	1-D8	LK6-2B	1:U5	1-F3
C60	1:K10	2-M0	CN8-1	1:D4	1-S9	LK2-1A	1:W4	1-E7	LK7A	1:B9	2-U9
C61	1:K10	2-L0			1-S8	LK2-1B	1:W4	1-E7	LK7B	1:B9	2-U9
C62	1:M10	2-I0			1-S7	LK2-2	1:U3	1-F8	LK7C	1:B8	2-V9
C63	1:L9	2-I0	CN8-3	1:D6	1-S4	LK2-2A	1:U4	1-G7	P1	1:A1	2-U8
C64	1:J9	2-L0			1-S4	LK2-2B	1:U4	1-G7	P2	1:A1	2-U7
C65	1:N9	2-J0			1-S2	LK2-3	1:R3	1-H8	P3	1:B1	2-V8
C66	1:L9	2-M0	CN8-4	1:D5	1-S0	LK2-3A	1:R4	1-I7	P4	1:B1	2-V8
C67	1:L10	2-K0	CN9-1	1:A4	1-U9	LK2-3B	1:R4	1-I7	PL1	1:X12	1-B5
C68	1:J10	2-N0			1-U8	LK2-4	1:P3	1-J8			1-B6

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Device	PCB	Circuit
		1-B7
		2-A2
		2-A5
		2-A9
		2-F2
		2-H4
		2-H5
		2-M3
		2-P4
		2-P5
		2-V0
PL2	1:X11	2-A7
		2-P3
PL3	1:B12	2-E2
		2-G4
		2-G5
		2-G6
		2-I2
		2-N3
		2-N4
		2-O5
		2-O6
		2-U0
		2-V4
		2-V5
		2-V6
		2-V9
PL16		1-D0
		1-D1
		1-D2
		2-R3
R0	1:D2	2-W7
R1	1:W3	1-E9
R2	1:U3	1-F9
R3	1:R4	1-H9
R4	1:P4	1-J9
R5	1:L4	1-L9
R6	1:J4	1-N9
R7	1:F4	1-P9
R8	1:D4	1-R9
R9	1:B4	1-T9
R10	1:A2	2-U8
R11	1:W4	1-D8
R12	1:T4	1-F8
R13	1:R4	1-H8
R14	1:P4	1-J8
R15	1:L4	1-L8
R16	1:J4	1-N8
R17	1:F4	1-P8
R18	1:D4	1-R8
R19	1:B4	1-T8
R20	1:W12	1-B7
R21	1:V7	1-E3
R22	1:V7	1-G3
R28	1:B9	2-U9
R30	1:W11	1-B6
R40	1:W10	1-B5
R41	1:F12	2-B6
R42	1:E13	2-B5
R43	1:E13	2-B5
R44	1:E13	2-C6
R45	1:E13	2-C5
R46	1:E12	2-C6
R47	1:E13	2-C5
R48	1:E12	2-C5
R49	1:E12	2-D6
R50	1:D13	2-D5
R51	1:D13	2-E5
R52	1:D13	2-F6
R53	1:D13	2-E5
R54	1:D13	2-F5
R55	1:D13	2-F5
R56	1:D13	2-F4
R57	1:D13	2-F6
R58	1:C13	2-F5
R59	1:D13	2-E4
R60	1:F9	2-Q6
R61	1:E9	2-R5
R62	1:E9	2-R5
R63	1:E9	2-R6
R64	1:E9	2-R5
R65	1:E9	2-S6
R66	1:E9	2-S5
R67	1:E9	2-S5
R68	1:E9	2-S6
R69	1:D9	2-T5
R70	1:D9	2-U5
R71	1:D9	2-U6
R72	1:D10	2-U5
R73	1:D10	2-U5
R74	1:D9	2-V5
R75	1:D10	2-V4
R76	1:D9	2-V6
R77	1:C10	2-V5
R78	1:D10	2-U4
R79	1:F11	2-I6
R80	1:E11	2-J5
R81	1:E11	2-J5
R82	1:E11	2-J6
R83	1:E11	2-J5
R84	1:E10	2-K6
R85	1:E11	2-K5
R86	1:E11	2-K5
R87	1:E11	2-K6
R88	1:D11	2-L5
R89	1:D11	2-M5
R90	1:D11	2-M6
R91	1:D12	2-M5
R92	1:D12	2-M5
R93	1:D11	2-N5
R94	1:D12	2-N4
R95	1:D11	2-N6
R96	1:C11	2-N5
R97	1:D11	2-M4
R98	1:U10	2-A2
R99	1:U8	2-C3
R100	1:U10	2-H2
R101	1:U10	2-G3
R102		1-A1
R103		1-B2
R104		1-C2
R105		1-C1
R106		1-C0
R107		1-B0
R108		1-B1
R109		1-A1
R110		1-A0
REG1	1:P10	2-U7
REG2	1:M10	2-I0
REG3	1:K10	2-L0
SK1	2:X6	1-D0
		1-D2
		1-D3
		1-D4
		1-D5
		1-D6
		1-D7
		1-D8
		1-D9
		2-C7
		2-C8
		2-C9
		2-M3
SK2	2:U6	1-F0
		1-F2
		1-F3
		1-F4
		1-F5
		1-F6
		1-F7
		1-F8
		1-F9
		2-E7
		2-E8
		2-E9
		2-N3
SK3	2:S6	1-H0
		1-H2
		1-H3
		1-H4
		1-H5
		1-H6
		1-H7
		1-H8
		1-H9
		2-G7
		2-G8
		2-G9
		2-P3
SK4	2:Q6	1-J0
		1-J2
		1-J3
		1-J4
		1-J5
		1-J6
		1-J7
		1-J8
		1-J9
		2-I7
		2-I8
		2-I9
		2-R3
SK5	2:M6	1-L0
		1-L2
		1-L3
		1-L4
		1-L5
		1-L6
		1-L7
		1-L8
		1-L9
		2-K7
		2-K8
		2-K9
		2-S3
SK6	2:K6	1-N0
		1-N2
		1-N3
		1-N4
		1-N5
		1-N6
		1-N7
		1-N8
		1-N9
		2-M2
		2-M7
		2-M8
		2-M9
SK7	2:G6	1-P0
		1-P2
		1-P3
		1-P4
		1-P5
		1-P6
		1-P7
		1-P8
		1-P9
		2-N2
		2-O7
SK8	2:E6	1-R0
		1-R2
		1-R3
		1-R4
		1-R5
		1-R6
		1-R7
		1-R8
		1-R9
		2-P2
		2-Q7
		2-Q8
		2-Q9
SK9	2:C6	1-T0
		1-T2
		1-T3
		1-T4
		1-T5
		1-T6
		1-T7
		1-T8
		1-T9
		2-R2
		2-S7
		2-S8
		2-S9
SK10	1:V8	1-C5
		1-C6
		1-C7
		2-B9
		2-E2
		2-E3
		2-S2
SK11	1:V7	1-D2
		1-D3
		1-D5
		1-D6
		1-D7
		2-C9
		2-M2
SK12	1:F7	1-V2
		1-V5
		1-V6
		1-V7
		1-V8
		2-N2
		2-T9
SK13	1:F8	2-A4
		2-A5
		2-A6
		2-F2
		2-H5
		2-H6
		2-P2
		2-P5
		2-P6
		2-T9
SK14	1:N8	2-B0
		2-E0
		2-G0
		2-R2
SK15	1:N7	2-C0
		2-E0
		2-H0
		2-S2
SK16	2:F2	1-D0
		1-D1
		1-D2
		2-S3
SW1		2-V8
SW2		1-C2
SW3		1-C1
SW4		1-B1
SW5		1-C1
SW6		1-C1
SW7		1-B1
SW8		1-C0
SW9		1-C0
SW10		1-B0

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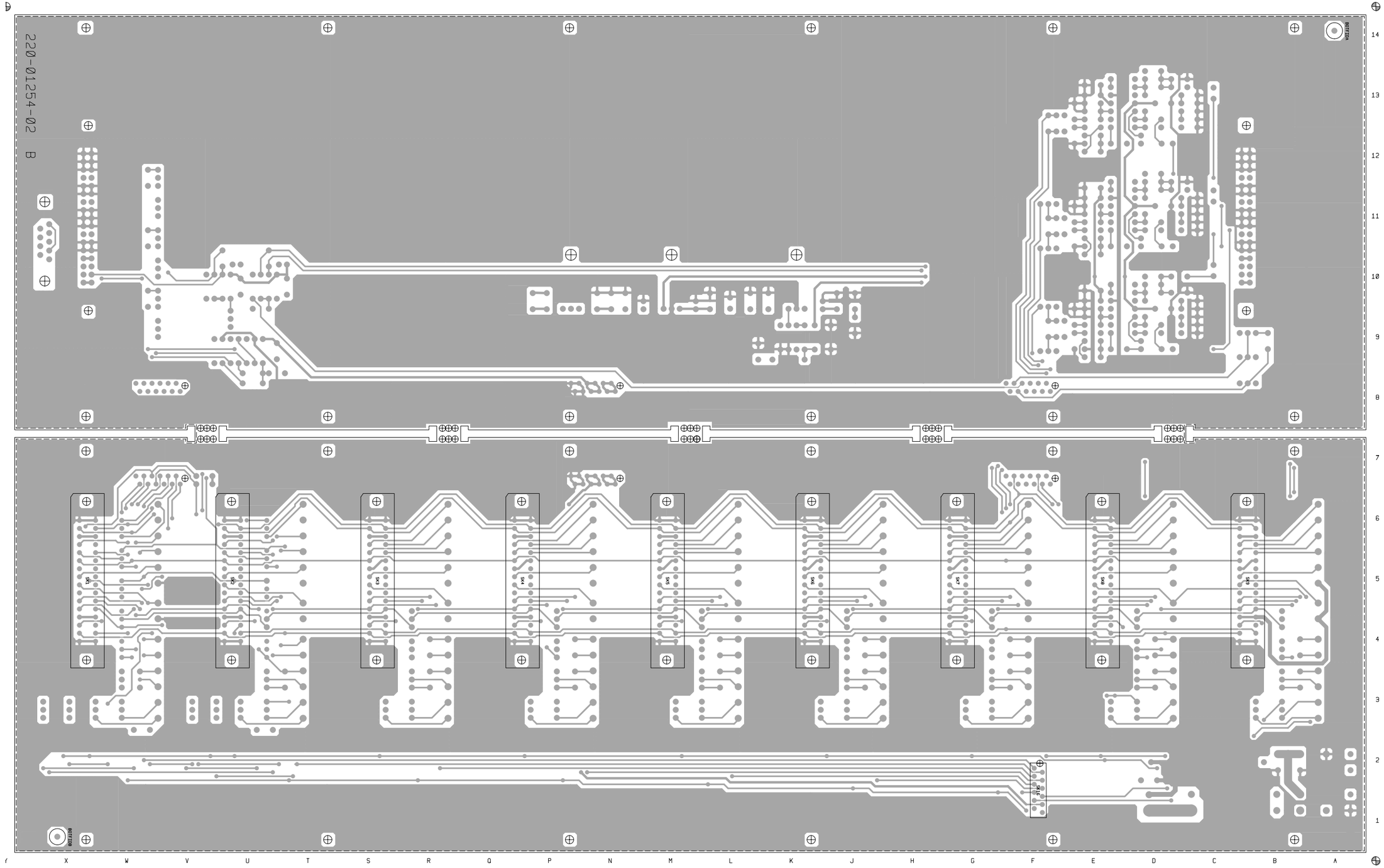

T805-04 PCB Layout - Bottom Side
220-01254-02

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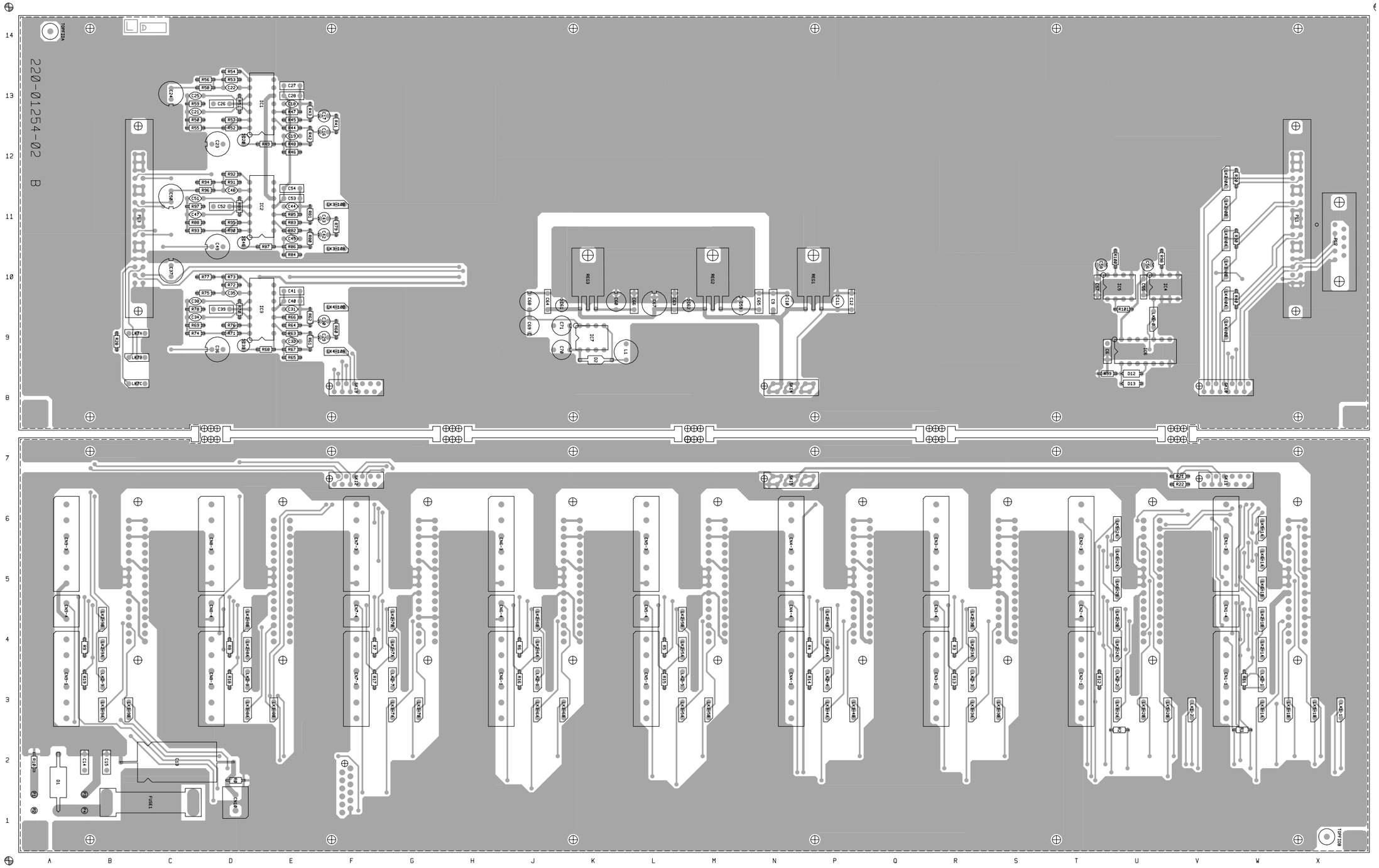

T805-04 PCB Layout - Top Side - 220-01254-02

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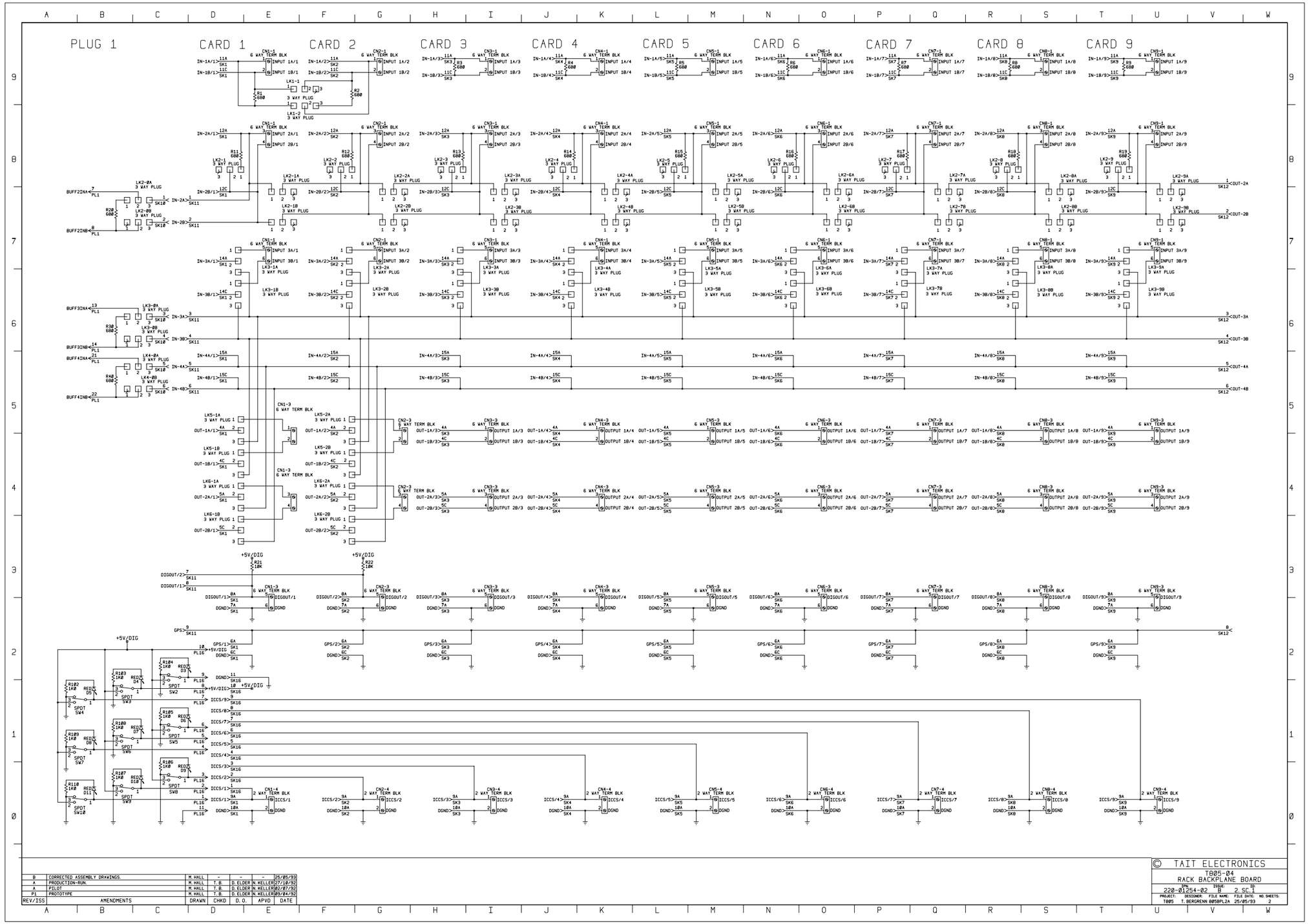

T805-04 Backplane - Sheet 1 of 2
220-01254-02

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PLUG 1 CARD 1 CARD 2 CARD 3 CARD 4 CARD 5 CARD 6 CARD 7 CARD 8 CARD 9 PLUG 3

PLUG 2

AUDIO

DIGITAL

CONNECTORS

SUPPLY

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
B	CORRECTED ASSEMBLY DRAWINGS.	M.HALL	-	-	-	25/05/93
A	PRODUCTION-RUN.	M.HALL	T.B.	D.ELDER	N.KELLER	27/10/92
A	PILOT	M.HALL	T.B.	D.ELDER	N.KELLER	02/07/92
P1	PROTOTYPE	M.HALL	T.B.	D.ELDER	N.KELLER	03/04/92

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T805-04
RACK BACKPLANE BOARD

DWG: 220-01254-02 ISSUE: B SHEET: 2 OF 2

PROJECT: T805 DESIGNER: T.BERGRENN FILE NAME: 805PL2A FILE DATE: 25/05/93 NO.SHEETS: 2

T805-04 Backplane - Sheet 2 of 2 - 220-01254-02

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T805-04 Parts List (IPN 220-01254-04)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped by component type in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

There were no amendments to the parts list at the time of publication.

Ref	Var	IPN	Description
C1		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C2		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C3		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C4		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C5		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C6		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C7		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C8		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C9		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C10		020-58100-04	CAP ELECT AI RDL 10M 16V 4X7MM
C11		020-58100-04	CAP ELECT AI RDL 10M 16V 4X7MM
C12		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C13		021-19100-01	CAP ELECT AXIAL 1000M 16V 12.5*25MM
C14		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C15		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C16		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C17		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C18		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C19		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C20		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C21		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C22		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C23		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C24		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C25		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C26		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C27		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C28		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C29		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C30		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C31		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C32		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C33		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C34		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C35		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C36		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C37		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C38		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C39		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C40		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C41		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C42		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C43		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C44		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C45		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C46		020-08100-04	CAP ELECT RADL 10UF 16V 4X7MM
C47		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C48		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C49		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C50		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C51		011-52100-01	CAP CER AI 10P 5% NPO 50/63V
C52		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C53		022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED
C54		022-54100-10	CAP MYLAR AI 1N 5% 63V POTTED
C55		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C56		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C57		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C58		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C59		020-08470-02	CAP ELECT RADL 47M 16V 6X11MM
C60		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C61		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C62		020-07100-05	CAP ELECT RADL 1UF 50V 4X7MM
C63		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C64		019-55100-01	CAP MONOLITHIC AI 10N 5% COG 50V
C65		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C66		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C67		020-09100-03	CAP ELECT RADL 100M 16V 8X11MM
C68		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C69		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C70		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C71		020-08560-09	CAP ELECT RADL 56M 50V 6.3X15.5MM L/S
C72		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C73		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C74		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
C75		011-53220-01	CAP CER AI 220P 10% N750 50/63V
C76		011-53220-01	CAP CER AI 220P 10% N750 50/63V
C77		011-53220-01	CAP CER AI 220P 10% N750 50/63V
C78		011-53220-01	CAP CER AI 220P 10% N750 50/63V
C79		011-04100-02	CAP CER 1N0 2.5MM 10% T/C B 50V
CN1-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN1-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN1-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN2-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN2-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN2-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN3-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN3-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN3-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN4-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN4-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN4-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN5-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN5-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN5-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN6-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN6-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN6-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN7-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN7-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN7-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN8-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH

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Ref	Var	IPN	Description
CN8-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN8-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN9-1		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN9-3		240-04030-08	TERMINAL BLOCK PCB MTG 6WAY FRT 5MM PITCH
CN9-4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
CN10		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
D1		001-00012-77	(S) DIODE 1N6277A ZENER 18V 1500W @ 1.0MS 1.5KE18A
D2		001-00011-05	(S) DIODE MUR105 ULTRA FAST 50V 1AMP
D12		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
D13		001-00013-45	(S) DIODE SCHOTTKY 1SS97/2
FB1		065-00010-08	BEAD FERRITE 4S3 3*0.7*10MM RED
FB2		065-00010-08	BEAD FERRITE 4S3 3*0.7*10MM RED
FB3		065-00010-08	BEAD FERRITE 4S3 3*0.7*10MM RED
FB4		065-00010-08	BEAD FERRITE 4S3 3*0.7*10MM RED
FS1		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS2		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS3		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS4		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS5		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS6		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS7		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS8		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FS9		265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED
FUSE1		265-00010-07	FUSE 10A CARTRIDGE 6x32MM BS4265
IC1		002-00012-25	(S) IC TL084 QUAD OP AMP JFET I/P
IC2		002-00012-25	(S) IC TL084 QUAD OP AMP JFET I/P
IC3		002-00012-25	(S) IC TL084 QUAD OP AMP JFET I/P
IC4		002-00021-01	(S) IC DS75176BN RS485 XCVR DIL-8
IC5		002-00021-01	(S) IC DS75176BN RS485 XCVR DIL-8
IC6		002-74000-14	(S) IC 74HC14 HEX SCHMITT TRIG INVERTR
IC7		002-00063-50	(S) IC MAX635 -5V INVERTING REGULATOR
L1		056-00022-04	IND FXD 470MH WOUND ON FE BEAD
LED1		008-00015-02	(S) LED RED COMPL WITH SATIN CHROME BEZEL-RECESSED
LK1-1		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK1-2		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-1		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-2		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-3		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-3A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-3B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-4		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-4A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-4B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-5		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-5A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-5B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-6		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-6A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-6B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-7		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-7A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-7B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-8		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-8A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-8B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-9		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-9A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK2-9B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-3A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-3B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-4A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-4B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-5A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-5B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-6A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-6B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-7A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-7B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-8A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-8B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-9A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK3-9B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK5-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-0		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-1A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-1B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-2A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK6-2B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK7A		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK7B		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LK7C		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
PL1		240-00025-37	CONN MALE 34 WAY IDC
PL2		240-02010-85	SKT 9 WAY PCB MOUNT STRAIGHT
PL3		240-00025-37	CONN MALE 34 WAY IDC
PL10		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL11		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL12		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL13		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL14		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL15		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
PL16		240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
R0		030-50000-20	RES AI ZERO OHM 4X1.6MM
R1		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R2		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R3		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R4		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R5		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R6		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R7		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R8		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R9		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R10		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R11		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R12		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R13		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R14		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R15		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R16		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R17		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R18		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R19		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R21		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R22		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R28		030-52560-20	RES FILM AI 56E 5% 0.4W 4X1.6MM
R41		030-54220-20	RES FILM AI 2K2 5% 0.4W 4X1.6MM
R42		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R43		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R44		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R45		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R46		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R47		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R48		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R49		030-54120-20	RES FILM AI 1K2 5% 0.4W 4X1.6MM
R50		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R51		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R52		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R53		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R54		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R55		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R56		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R57		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R58		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R59		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R60		030-54220-20	RES FILM AI 2K2 5% 0.4W 4X1.6MM
R61		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R62		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R63		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R64		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R65		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R66		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R67		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R68		030-54120-20	RES FILM AI 1K2 5% 0.4W 4X1.6MM
R69		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R70		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R71		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R72		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R73		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R74		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R75		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R76		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R77		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R78		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R79		030-54220-20	RES FILM AI 2K2 5% 0.4W 4X1.6MM
R80		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R81		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R82		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R83		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R84		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R85		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R86		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R87		030-54120-20	RES FILM AI 1K2 5% 0.4W 4X1.6MM
R88		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM
R89		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R90		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R91		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R92		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R93		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R94		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
R95		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R96		030-53330-20	RES FILM AI 330E 5% 0.4W 4X1.6MM
R97		030-56100-20	RES FILM AI 100K 5% 0.4W 4X1.6MM

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Ref	Var	IPN	Description
R98		030-52560-20	RES FILM AI 56E 5% 0.4W 4X1.6MM
R99		030-54470-20	RES FILM AI 4K7 5% 0.4W 4X1.6MM
R100		030-52560-20	RES FILM AI 56E 5% 0.4W 4X1.6MM
R101		030-55100-20	RES FILM AI 10K 5% 0.4W 4X1.6MM
REG1		002-00780-53	(S) IC MC78T05CT 5V REGULATOR 3AMP TO-220
REG2		002-00780-53	(S) IC MC78T05CT 5V REGULATOR 3AMP TO-220
REG3		002-00078-08	(S) IC MC7808ACT 8V REG(LINEAR)1AMP TO-220
SK1		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK2		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK3		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK4		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK5		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK6		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK7		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK8		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK9		240-02010-81	CONN 32 WAY DIN 41612 FEMALE
SK10		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK11		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK12		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK13		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK14		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK15		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SK16		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SW1		230-00010-24	SWITCH ROCKER SPST 250V 16A PNL MTG ILLUM

Ref	Var	IPN	Description

T805-04 Mechanical & Miscellaneous Parts (IPN 220-01254-04)

IPN	Description
200-00010-04	WIRE T/C 0.7MM For ferrite beads.
201-00030-04	WIRE #1 T/C WIRE 7/0.2MM PVC YELLOW Front panel power LED.
201-00030-10	WIRE #1 T/C WIRE 7/0.2MM PVC BLACK Front panel power LED.
201-00050-02	CABLE AUTO RED 7/0.32MM PVC Front panel power switch.
205-00010-22	CABLE FLAT RBBN 34 CORE 28AWG GREY 900mm front panel. 40mm x3 PCB.
220-01254-04	PCB T805-04 QUASI-SYNC RACK FRAME
240-04020-62	SKT 2 WAY RECEPTL SHORTING LINK For 3 way 1 row PCB headers.
265-00010-66	FUSE, 1A SLOW-BLOW MINIATURE WIRE-ENDED Ten fuses to be packed in bag and fixed to inside rear cover.
303-23129-00	COVER SET OF TOP AND BOTTOM FOR 19IN RACK ASS.
303-23145-00	COVER REAR T805 SIGNAL PROCESSOR
316-06468-03	PNL A1M2787/2 FRT SCRN T805-04 COMPL
319-01169-00	STRIP TAPPED 84E ACCESSORY FOR 19IN RACK ASS. For securing PCBs and front panel.
319-30054-00	SPACER INSULATOR 42E (PKT OF 12) 19IN RACK ASS. For insulating PCBs from rack.
319-40011-00	STRAP T805 EARTHING Connect 2 PCBs via SK10/11, SK12/13 & SK14/15.
322-10090-00	SUB RACK 6U X 84E GOUGH 100620 Kit of parts required to complete rack.
322-10092-00	VERO BAG OF 10 X CARD & MODULE GUIDE FOR 19" RACK Plastic guides for ASP cards.
340-00010-06	FUSE CLIP PCB MTG 6.3MM CARTRIDGE FUSE FUSE1.
345-00020-02	SCREW M2.5x10 PAN POZI ST BZ For securing PCB to rack.
345-00030-04	SCREW M2.6x8MM PAN PHILIPS NI PLT For securing SK1-SK9 to PCB.
345-00030-20	SCREW M2.5x8MM BLACK CSK POZI MACHINE SCREW For securing spacer insulator between PCB and rack.
345-00040-10	SCREW M3x6MM PAN POZI ST BZ For mounting REG1, REG2 and REG3.
345-00050-07	SCREW M4x10MM PAN POZI ST BZ For securing front panel earth strap.
352-00010-05	NUT M2.6 MACH HEX ST NI PLATE For securing SK1-SK9 to PCB.
352-00010-08	NUT M3 COLD FORM HEX ST BZ For mounting REG1, REG2 and REG3.
352-00010-10	NUT M4 COLD FORM HEX ST BZ For securing front panel earth strap.
353-00010-03	WASHER M2.5/M2.6 FLAT ST BZ For SK1-SK9.
353-00010-15	WASHER M3 FIBRE 8MM OD X 1MM REG1, REG2 & REG3.

IPN	Description
356-00010-05	TAG SOLDER 4MM LONG M6144/4.2 Front panel earth strap.
356-00020-06	RECEPTL 6.3MM QUICK CONNECT FLARED INSULATED Front panel power switch wires.
365-00011-41	LABEL STATIC WARNING A4A320 ORANGE
365-01370-00	LABEL WARNING T805-04 BS6328 CLAUSE 8.1
365-01399-00	LABEL QS BABT APPROVAL
365-01500-00	LABEL CE CONFORMITY (12x24MM)
365-01513-00	LABEL FCC CLASS A DIGITAL
369-00010-14	TIE CABLE NYLON 100x2.6MM
369-00010-24	BASE CABLE TIE MTG SELF ADHESIVE
399-00010-51	BAG PLASTIC 75x100MM
400-00010-30	SLEEVING 3MM PVC For front panel earth strap.
400-00020-05	SLEEVING 1.5MM SIL RUBBER 9x 30mm res to neg leg LED. 9x 10mm pos leg LED. 16x 70mm link wire between switches. 2x 15mm LED yellow and black wire.
410-01091-00	PKG A3M2805 T1560 POLYST FOAM (6 PIECES)
410-01092-00	CTN T1560 551x371x316MM
800-00000-47	CLIP CABLE CLAMP SELF ADHESIVE FOR 12 WAY RBBN
937-00000-10	SOLDERWICK Front panel earth strap.

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T805-04 Grid Reference Index (IPN 220-01254-04)

How To Use This Grid Reference Index

The first digit in the PCB layout reference is a "1" or "2", indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C1	1:F1	1-E2	C62	1:M10	2-I0			1-Q8			2-U5
C2	1:F2	1-F0	C63	1:L9	2-I0			1-Q7			2-S5
C3	1:F2	1-H0	C64	1:J9	2-L0	CN7-3	1:F6	1-Q4	IC4	1:U10	2-B2
C4	1:F2	1-J0	C65	1:N9	2-J0			1-Q4	IC5	1:U10	2-G2
C5	1:F1	1-L1	C66	1:L9	2-M0			1-Q2	IC6	1:U9	2-J2
C6	1:U9	2-K2	C67	1:L10	2-K0	CN7-4	1:F5	1-Q0			2-C3
C7	1:F2	1-N1	C68	1:J10	2-N0	CN8-1	1:D4	1-S9			2-C3
C8	1:F1	1-P1	C69	1:J9	2-N0			1-S8			2-R0
C9	1:N9	2-T7	C70	1:K9	2-P0			1-S7			2-D3
C10	1:N10	2-U7	C71	1:K9	2-P0	CN8-3	1:D6	1-S4			2-R0
C11	1:P10	2-V7	C72	1:F1	1-R1			1-S4			2-D3
C12	1:P9	2-V7	C73	1:F1	1-T1			1-S2	IC7	1:K9	2-N0
C13	1:B2	2-T8	C74	1:D1	2-W8	CN8-4	1:D5	1-S0	L1	1:L9	2-O0
C14	1:B2	2-T8	C75	1:B1	2-V7	CN9-1	1:A4	1-U9	LED1		2-U7
C15	1:B2	2-U8	C76	1:D1	2-V7			1-U8	LK1-1	1:X3	1-E9
C16	1:F12	2-B6	C77	1:A7	2-D8			1-U7	LK1-2	1:V3	1-E8
C17	1:F13	2-B5	C78	1:X7	2-T8	CN9-3	1:A6	1-U4	LK2-1	1:W3	1-D8
C18	1:E13	2-C5	C79	1:F2	1-F0			1-U4	LK2-1A	1:W4	1-E7
C19	1:E12	2-C6	CN1-1	1:W4	1-E9			1-U2	LK2-1B	1:W4	1-E7
C20	1:D12	2-D6			1-E8	CN9-4	1:A5	1-U0	LK2-2	1:U3	1-F8
C21	1:D13	2-D5			1-E7	CN10	1:D1	2-W8	LK2-2A	1:U4	1-G7
C22	1:D13	2-E5	CN1-3	1:W6	1-E4	D1	1:A1	2-V8	LK2-2B	1:U4	1-G7
C23	1:D12	2-F6			1-E4	D2	1:K9	2-O0	LK2-3	1:R3	1-H8
C24	1:C13	2-F5			1-E2	D3		1-D2	LK2-3A	1:R4	1-I7
C25	1:D13	2-E4	CN1-4	1:W5	1-E0	D4		1-C2	LK2-3B	1:R4	1-I7
C26	1:D13	2-B4	CN2-1	1:T4	1-G9	D5		1-B1	LK2-4	1:P3	1-J8
C27	1:E13	2-C4			1-G8	D6		1-D1	LK2-4A	1:P4	1-K7
C28	1:E13	2-C4			1-G7	D7		1-C1	LK2-4B	1:P4	1-K7
C29	1:F9	2-R6	CN2-3	1:T6	1-G4	D8		1-B1	LK2-5	1:M3	1-L8
C30	1:F9	2-R5			1-G4	D9		1-D0	LK2-5A	1:M4	1-M7
C31	1:E10	2-S5			1-G2	D10		1-C0	LK2-5B	1:M4	1-M7
C32	1:E9	2-S6	CN2-4	1:T5	1-G0	D11		1-B0	LK2-6	1:J3	1-N8
C33	1:D9	2-T6	CN3-1	1:R4	1-I9	D12	1:U8	2-D3	LK2-6A	1:J4	1-O7
C34	1:D9	2-T5			1-I8	D13	1:U8	2-D3	LK2-6B	1:J4	1-O7
C35	1:D10	2-U5			1-I7	FB1	1:A2	2-U8	LK2-7	1:G3	1-P8
C36	1:D9	2-V6	CN3-3	1:R6	1-I4	FB2	1:B2	2-V8	LK2-7A	1:G4	1-Q7
C37	1:C10	2-V5			1-I4	FB3	1:A2	2-U8	LK2-7B	1:G4	1-Q7
C38	1:D10	2-U4			1-I2	FB4	1:A2	2-U7	LK2-8	1:D3	1-R8
C39	1:D10	2-R4	CN3-4	1:R5	1-I0	FS1	1:W6	2-C8	LK2-8A	1:D4	1-S7
C40	1:E10	2-S4	CN4-1	1:N4	1-K9	FS2	1:U6	2-E8	LK2-8B	1:D4	1-S7
C41	1:E10	2-R4			1-K8	FS3	1:R6	2-G8	LK2-9	1:B3	1-T8
C42	1:F11	2-J6			1-K7	FS4	1:P6	2-I8	LK2-9A	1:B4	1-U7
C43	1:F11	2-J5	CN4-3	1:N6	1-K4	FS5	1:M6	2-K8	LK2-9B	1:B4	1-U7
C44	1:E11	2-K5			1-K4	FS6	1:J6	2-M8	LK3-1A	1:W3	1-D7
C45	1:E11	2-K6			1-K2	FS7	1:G6	2-O8	LK3-1B	1:X3	1-D6
C46	1:D11	2-L6	CN4-4	1:N5	1-K0	FS8	1:D6	2-Q8	LK3-2A	1:U3	1-F7
C47	1:D11	2-L5	CN5-1	1:L4	1-M9	FS9	1:B6	2-S8	LK3-2B	1:U3	1-F6
C48	1:D11	2-M5			1-M8	FUSE1	1:C1	2-V8	LK3-3A	1:R3	1-H7
C49	1:D11	2-N6			1-M7	IC1	1:E13	2-B5	LK3-3B	1:S3	1-H6
C50	1:C11	2-N5	CN5-3	1:L6	1-M4			2-C6	LK3-4A	1:P3	1-J7
C51	1:D11	2-M4			1-M4			2-E5	LK3-4B	1:P3	1-J6
C52	1:D11	2-J4			1-M2			2-E5	LK3-5A	1:M3	1-L7
C53	1:E11	2-K4	CN5-4	1:L5	1-M0			2-D5	LK3-5B	1:M3	1-L6
C54	1:E12	2-J4	CN6-1	1:J4	1-O9	IC2	1:E11	2-J5	LK3-6A	1:J3	1-N7
C55	1:U10	2-A3			1-O8			2-K6	LK3-6B	1:K3	1-N6
C56	1:U10	2-B3			1-O7			2-M5	LK3-7A	1:G3	1-P7
C57	1:T10	2-H3	CN6-3	1:J6	1-O4			2-M5	LK3-7B	1:G3	1-P6
C58	1:T10	2-H3			1-O4			2-L5	LK3-8A	1:D3	1-R7
C59	1:M10	2-J0			1-O2	IC3	1:E9	2-R5	LK3-8B	1:E3	1-R6
C60	1:K10	2-M0	CN6-4	1:J5	1-O0			2-S6	LK3-9A	1:B3	1-T7
C61	1:K10	2-L0	CN7-1	1:F4	1-Q9			2-U5	LK3-9B	1:B3	1-T6

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Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
LK5-1A	1:W6	1-D5	R45	1:E13	2-C5			1-F4			1-R2
LK5-1B	1:X3	1-D4	R46	1:E12	2-C6			1-F5			1-R3
LK5-2A	1:U6	1-F5	R47	1:E13	2-C5			1-F6			1-R4
LK5-2B	1:V3	1-F4	R48	1:E12	2-C5			1-F7			1-R5
LK6-0	1:U9	2-C3	R49	1:E12	2-D6			1-F8			1-R6
LK6-1A	1:W5	1-D4	R50	1:D13	2-D5			1-F9			1-R7
LK6-1B	1:W5	1-D3	R51	1:D13	2-E5			2-E7			1-R8
LK6-2A	1:U5	1-F4	R52	1:D13	2-F6			2-E8			1-R9
LK6-2B	1:U5	1-F3	R53	1:D13	2-E5			2-E9			2-P2
LK7A	1:B9	2-U9	R54	1:D13	2-F5			2-N3			2-Q7
LK7B	1:B9	2-U9	R55	1:D13	2-F5	SK3	2:S6	1-H0			2-Q8
LK7C	1:B8	2-V9	R56	1:D13	2-F4			1-H2			2-Q9
P1	1:A1	2-U8	R57	1:D13	2-F6			1-H3	SK9	2:C6	1-T0
P2	1:A1	2-U7	R58	1:C13	2-F5			1-H4			1-T2
P3	1:B1	2-V8	R59	1:D13	2-E4			1-H5			1-T3
P4	1:B1	2-V8	R60	1:F9	2-Q6			1-H6			1-T4
PL1	1:X12	1-B5	R61	1:E9	2-R5			1-H7			1-T5
		1-B6	R62	1:E9	2-R5			1-H8			1-T6
		1-B7	R63	1:E9	2-R6			1-H9			1-T7
		2-A2	R64	1:E9	2-R5			2-G7			1-T8
		2-A5	R65	1:E9	2-S6			2-G8			1-T9
		2-A9	R66	1:E9	2-S5			2-G9			2-R2
		2-F2	R67	1:E9	2-S5			2-P3			2-S7
		2-H4	R68	1:E9	2-S6	SK4	2:Q6	1-J0			2-S8
		2-H5	R69	1:D9	2-T5			1-J2			2-S9
		2-M3	R70	1:D9	2-U5			1-J3	SK10	1:V8	1-C5
		2-P4	R71	1:D9	2-U6			1-J4			1-C6
		2-P5	R72	1:D10	2-U5			1-J5			1-C7
		2-V0	R73	1:D10	2-U5			1-J6			2-B9
PL2	1:X11	2-A7	R74	1:D9	2-V5			1-J7			2-E2
		2-P3	R75	1:D10	2-V4			1-J8			2-E3
PL3	1:B12	2-E2	R76	1:D9	2-V6			1-J9			2-S2
		2-G4	R77	1:C10	2-V5			2-I7	SK11	1:V7	1-D2
		2-G5	R78	1:D10	2-U4			2-I8			1-D3
		2-G6	R79	1:F11	2-I6			2-I9			1-D5
		2-I2	R80	1:E11	2-J5			2-R3			1-D6
		2-N3	R81	1:E11	2-J5	SK5	2:M6	1-L0			1-D7
		2-N4	R82	1:E11	2-J6			1-L2			2-C9
		2-O5	R83	1:E11	2-J5			1-L3			2-M2
		2-O6	R84	1:E10	2-K6			1-L4	SK12	1:F7	1-V2
		2-U0	R85	1:E11	2-K5			1-L5			1-V5
		2-V4	R86	1:E11	2-K5			1-L6			1-V6
		2-V5	R87	1:E11	2-K6			1-L7			1-V7
		2-V6	R88	1:D11	2-L5			1-L8			1-V8
		2-V9	R89	1:D11	2-M5			1-L9			2-N2
PL16		1-D0	R90	1:D11	2-M6			2-K7			2-T9
		1-D1	R91	1:D12	2-M5			2-K8	SK13	1:F8	2-A4
		1-D2	R92	1:D12	2-M5			2-K9			2-A5
		2-R3	R93	1:D11	2-N5			2-S3			2-A6
R0	1:D2	2-W7	R94	1:D12	2-N4	SK6	2:K6	1-N0			2-F2
R1	1:W3	1-E9	R95	1:D11	2-N6			1-N2			2-H5
R2	1:U3	1-F9	R96	1:C11	2-N5			1-N3			2-H6
R3	1:R4	1-H9	R97	1:D11	2-M4			1-N4			2-P2
R4	1:P4	1-J9	R98	1:U10	2-A2			1-N5			2-P5
R5	1:L4	1-L9	R99	1:U8	2-C3			1-N6			2-P6
R6	1:J4	1-N9	R100	1:U10	2-H2			1-N7			2-T9
R7	1:F4	1-P9	R101	1:U10	2-G3			1-N8	SK14	1:N8	2-B0
R8	1:D4	1-R9	REG1	1:P10	2-U7			1-N9			2-E0
R9	1:B4	1-T9	REG2	1:M10	2-I0			2-M2			2-G0
R10	1:A2	2-U8	REG3	1:K10	2-L0			2-M7			2-R2
R11	1:W4	1-D8	SK1	2:X6	1-D0			2-M8	SK15	1:N7	2-C0
R12	1:T4	1-F8			1-D2			2-M9			2-E0
R13	1:R4	1-H8			1-D3	SK7	2:G6	1-P0			2-H0
R14	1:P4	1-J8			1-D4			1-P2			2-S2
R15	1:L4	1-L8			1-D5			1-P3	SK16	2:F2	1-D0
R16	1:J4	1-N8			1-D6			1-P4			1-D1
R17	1:F4	1-P8			1-D7			1-P5			1-D2
R18	1:D4	1-R8			1-D8			1-P6			2-S3
R19	1:B4	1-T8			1-D9			1-P7	SW1		2-V8
R21	1:V7	1-E3			2-C7			1-P8			
R22	1:V7	1-G3			2-C8			1-P9			
R28	1:B9	2-U9			2-C9			2-N2			
R41	1:F12	2-B6			2-M3			2-O7			
R42	1:E13	2-B5	SK2	2:U6	1-F0			2-O8			
R43	1:E13	2-B5			1-F2			2-O9			
R44	1:E13	2-C6			1-F3	SK8	2:E6	1-R0			

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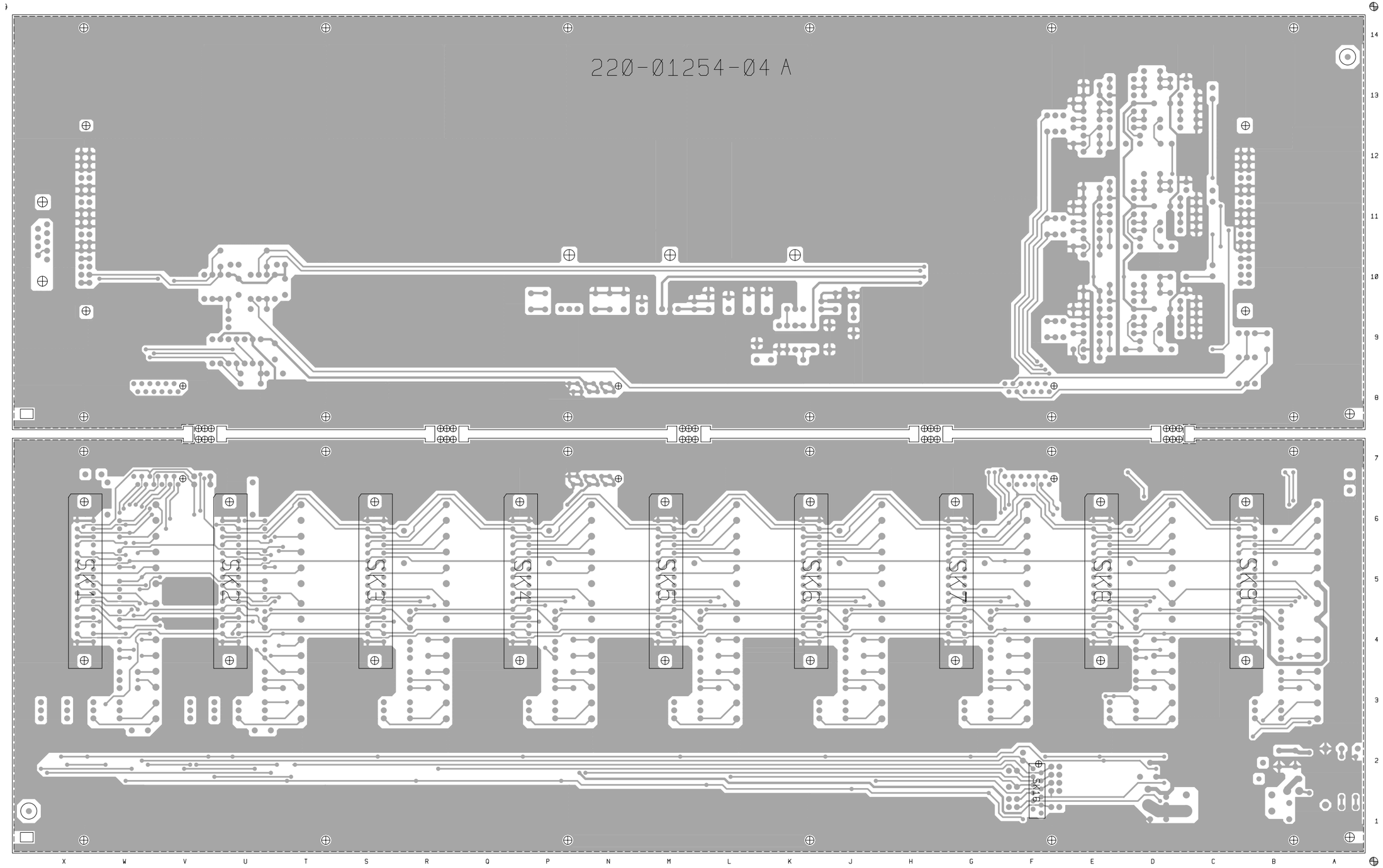

T805-04 PCB Layout - Bottom Side
220-01254-04

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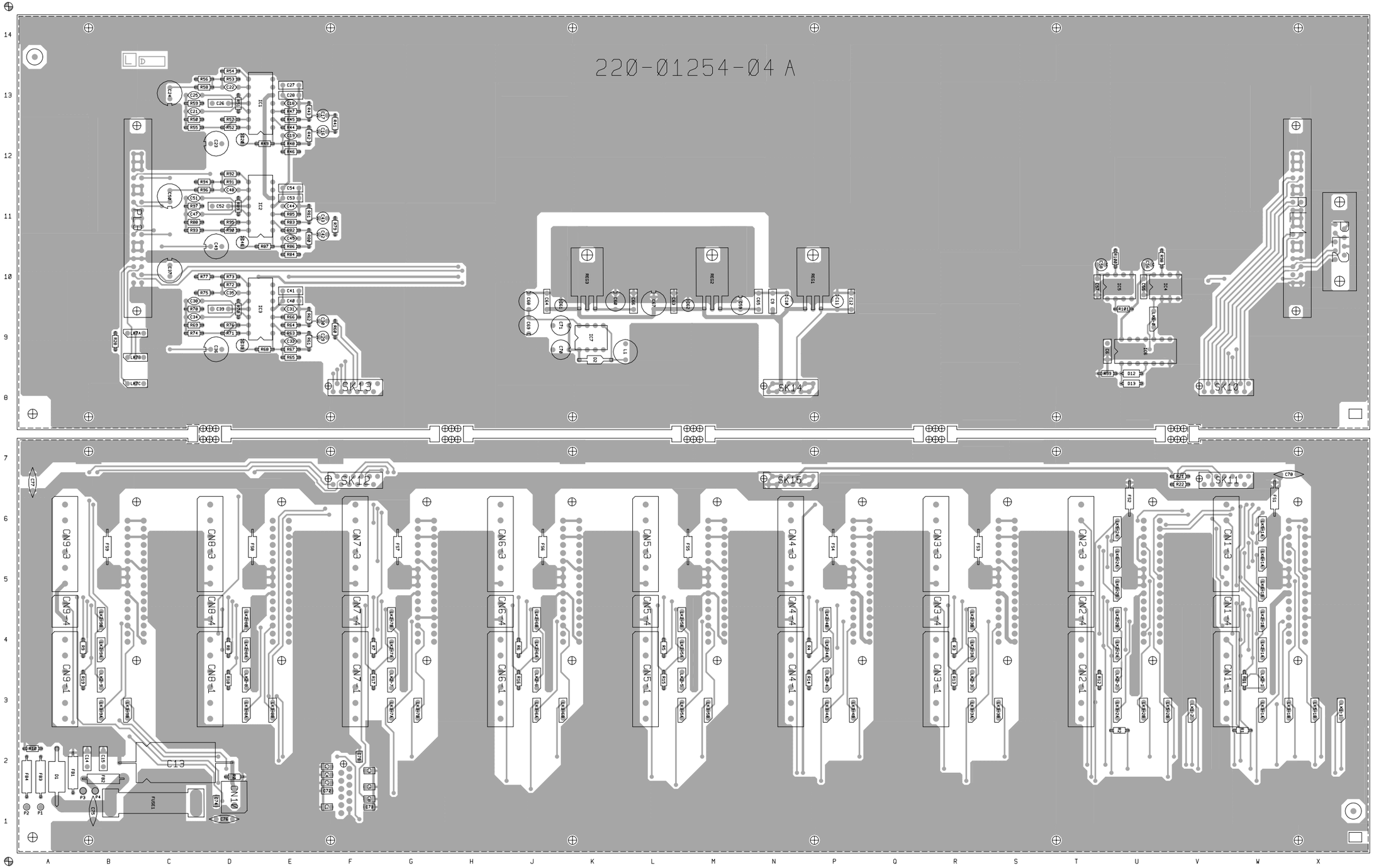

T805-04 PCB Layout - Top Side - 220-01254-04

30 / 09 / 96

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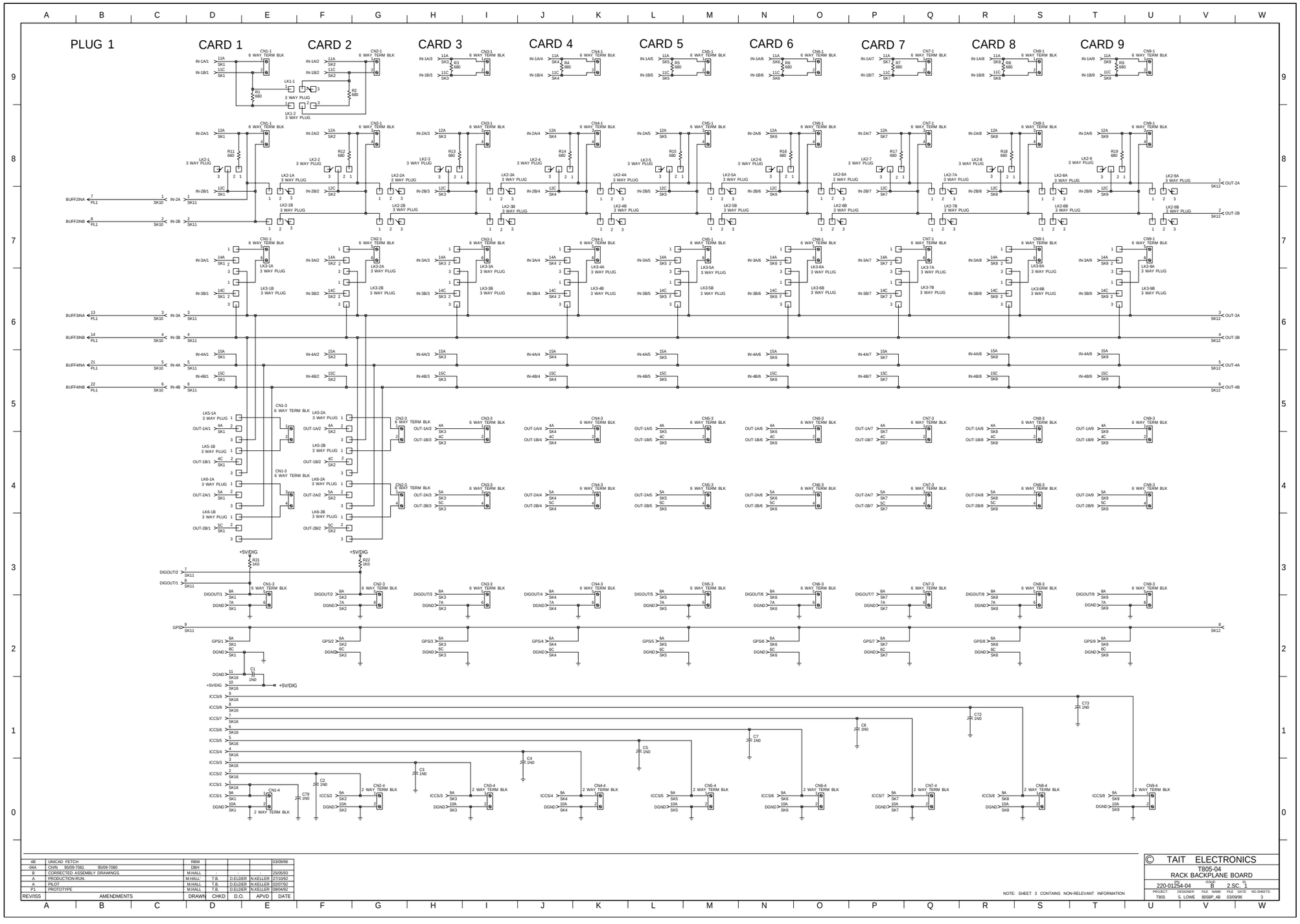

T805-04 Backplane - Sheet 1 of 2
220-01254-04

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PLUG 1 CARD 1 CARD 2 CARD 3 CARD 4 CARD 5 CARD 6 CARD 7 CARD 8 CARD 9 PLUG 3

PLUG 2

AUDIO

DIGITAL

CONNECTORS

SUPPLY

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
4B	UNICAD FETCH	RBM				03/09/96
-04A	CHN 95/09-7061 95/09-7080	DBH				03/09/96
B	CORRECTED ASSEMBLY DRAWINGS.	M.HALL	-	-	-	25/05/93
A	PRODUCTION-RUN.	M.HALL	T.B.	D.ELDER	N.KELLER	27/10/92
A	PILOT	M.HALL	T.B.	D.ELDER	N.KELLER	02/07/92
P1	PROTOTYPE	M.HALL	T.B.	D.ELDER	N.KELLER	09/04/92

NOTE: SHEET 3 CONTAINS NON-RELEVANT INFORMATION

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T805-04
RACK BACKPLANE BOARD

220-01254-04 | ISSUE: B | SCALE: 2 | SC.: 2

PROJECT	DESIGNER:	FILE NAME:	FILE DATE	NO.SHEETS:
T805	S. LOWE	805BP_4B	03/09/96	3

T805-04 Backplane - Sheet 2 of 2 - 220-01254-04

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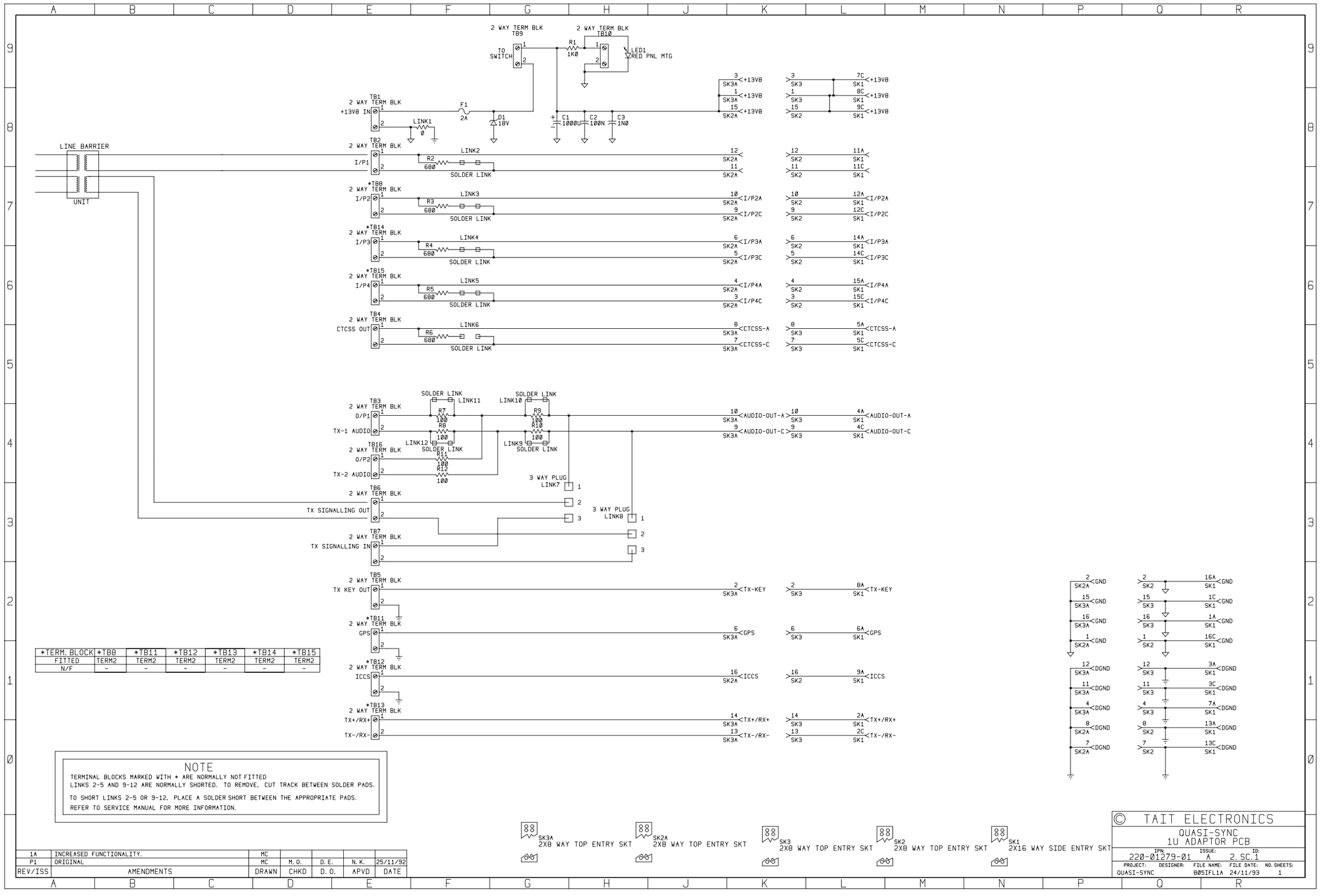
14.4 T805-06 Adaptor PCB

This section contains the following information.



*TERM. BLOCK	*TB8	*TB11	*TB12	*TB13	*TB14	*TB15
FITTED	TERM2	TERM2	TERM2	TERM2	TERM2	TERM2
N/F	-	-	-	-	-	-

NOTE

TERMINAL BLOCKS MARKED WITH * ARE NORMALLY NOT FITTED
LINKS 2-5 AND 9-12 ARE NORMALLY SHORTED. TO REMOVE, CUT TRACK BETWEEN SOLDER PADS.

TO SHORT LINKS 2-5 OR 9-12, PLACE A SOLDER SHORT BETWEEN THE APPROPRIATE PADS.

REFER TO SERVICE MANUAL FOR MORE INFORMATION.

REV/ISS	AMENDMENTS	DRAWN	CHKD	D. O.	APVD	DATE
1A	INCREASED FUNCTIONALITY.	MC				
P1	ORIGINAL	MC	M. O.	D. E.	N. K.	25/11/92

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QUASI-SYNC
1U ADAPTOR PCB

IPN:	ISSUE:	ID:
220-01279-01	A	2.SC.1

PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO. SHEETS:
QUASI-SYNC		805IFL1A	24/11/93	1

T805-06 Circuit Diagram
220-01279-01

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T805-06 Parts List (IPN 220-01279-00)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped by component type in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

Add: 365-01399-00 label QS BABT approval (93/09-479)

Ref	Var	IPN	Description
C1		020-19100-01	CAP ELECT RADL 1000M 25V 16X25MM
C2		020-59100-06	CAP ELECT AI RDL 100M 16V 6.3X11MM
C3		011-54100-01	CAP CER AI 1N 10% T/C B 63V
D1		001-00012-77	(S) DIODE 1N6277A ZENER 18V 1500W @ 1.0MS
F1		265-00010-46	FUSE 1.5A CARTRIDGE 6*32MM SLOBLOW
LED1		008-00015-02	(S) LED RED COMPL WITH SATEN CHROME BEZE
LINK1		030-50000-20	RES AI ZERO OHM 4X1.6MM
LINK2		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LINK3		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
R1		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R2		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R3		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
SW1		230-00010-24	SWITCH ROCKER SPST 250V 16A PNL MTG ILLU
SK1		240-02010-89	CONN 32WAY FEM RIGHT-ANGLE DIN41612
SK2		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
SK2A		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
SK3		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
SK3A		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
TB1		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB2		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB3		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB5		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB6		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB7		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB8		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB9		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB10		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.

Ref	Var	IPN	Description

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T805-06 Mechanical & Miscellaneous Parts (220-01279-00)

IPN	Description
201-00030-02	WIRE #1 T/C WIRE 7/0.2MM PVC RED
201-00030-10	WIRE #1 T/C WIRE 7/0.2MM PVC BLACK
201-00050-02	CABLE AUTO 148 RED 23/0.2MM PVC
205-00010-03	CABLE TWIN CYCLE FLEX 2/7/0.2MM BLACK Audio in (Rx) kit in plastic bag
205-00010-12	CABLE FLAT RBBN 16 CORE 16/7/0.1 GREY
220-01279-00	PCB QUASI-SYNC 1U ADAPTOR
240-00020-54	PLUG 16 WAY 2X8 FLAT CABLE TERMN MICROMATCH
318-01019-00	RACK BIN A2M2799 ONE UNIT
340-00010-06	FUSE CLIP PCB MTG 6.3MM CARTRIDGE FUSE
345-00040-06	SCREW M3*8MM PAN POZI ST BZ
345-00040-11	SCREW M3X10MM PAN POZI ST BZ kit in plastic bag
352-00010-08	NUT M3 COLD FORM HEX ST BZ kit in plastic bag
353-00010-11	WASHER M3 FLAT 9.5MM*0.9MM ST BZ kit in plastic bag
353-00010-13	WASHER M3 SHAKEPROOF INT BZ Audio Power PCB to U Rack
356-00020-06	RECEPTL 6.3MM QUICK CONNECT FLARED INSULATE
360-00010-11	GROMMET FLAT CORD CLAMPING TYPE B kit in plastic bag
362-00010-13	BUSH INSULATING 1.1MM TOP HAT
365-00100-20	LABEL WHITE S/A 28X11MM QUIKSTIK RW718/4
365-01376-00	LABEL A4A724 SOFTWARE WARNING GUIDE
369-00010-14	TIE CABLE NYLON 100*2.6MM
369-00010-14	TIE CABLE NYLON 100*2.6MM kit in plastic bag
369-00010-24	BASE CABLE TIE MTG SELF ADHESIVE
399-00010-51	BAG PLASTIC 75*100MM
400-00020-05	SLEEVING 1.5MM SIL RUBBER
410-01088-00	CRTN T800 SLIMLINE 520X440X150MM
410-01089-00	PKG T801 A3M2806 POLYST FOAM (COMPLETE 6 PIE
428-00002-00	SOFTWARE LICENCE AGREEMENT

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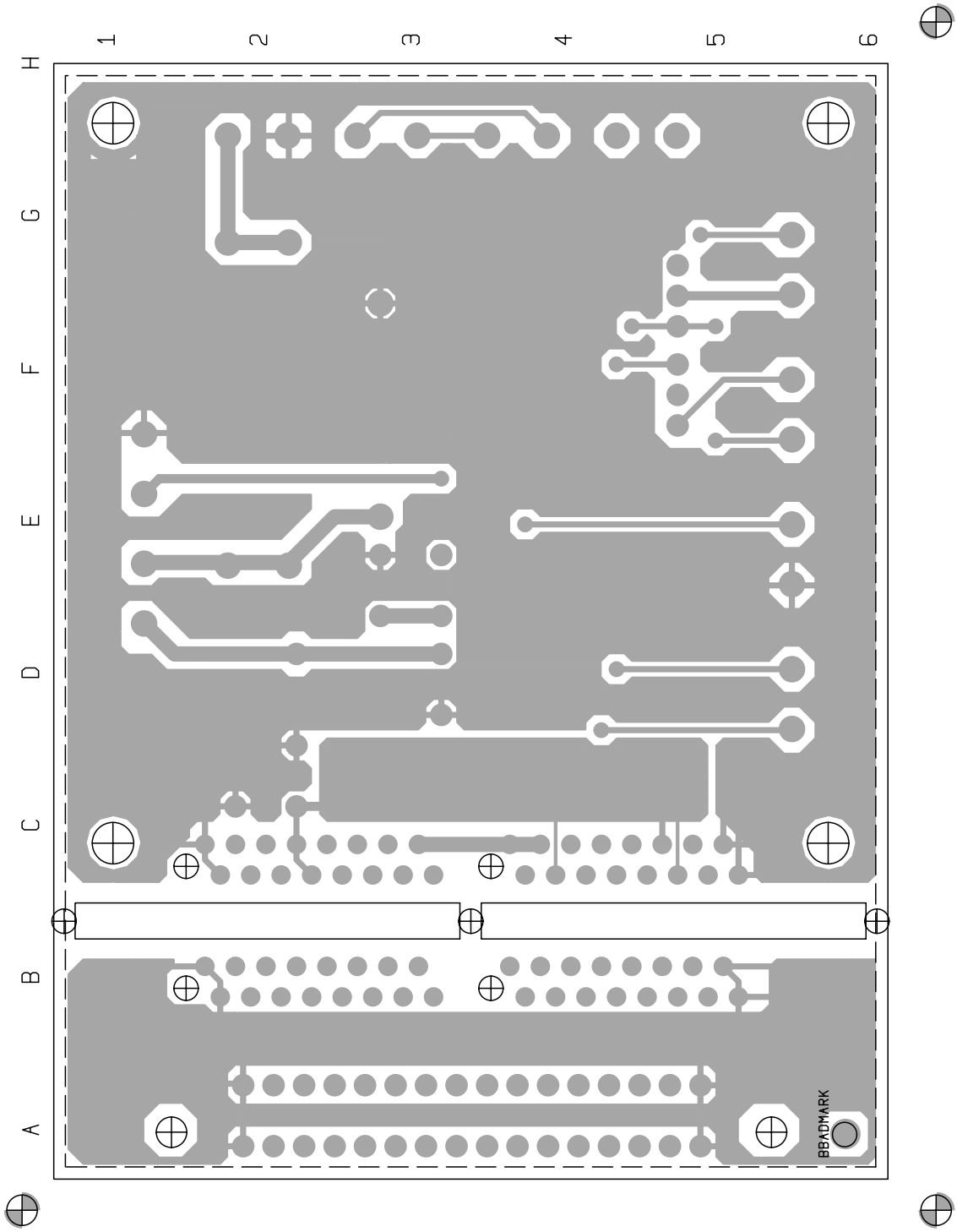
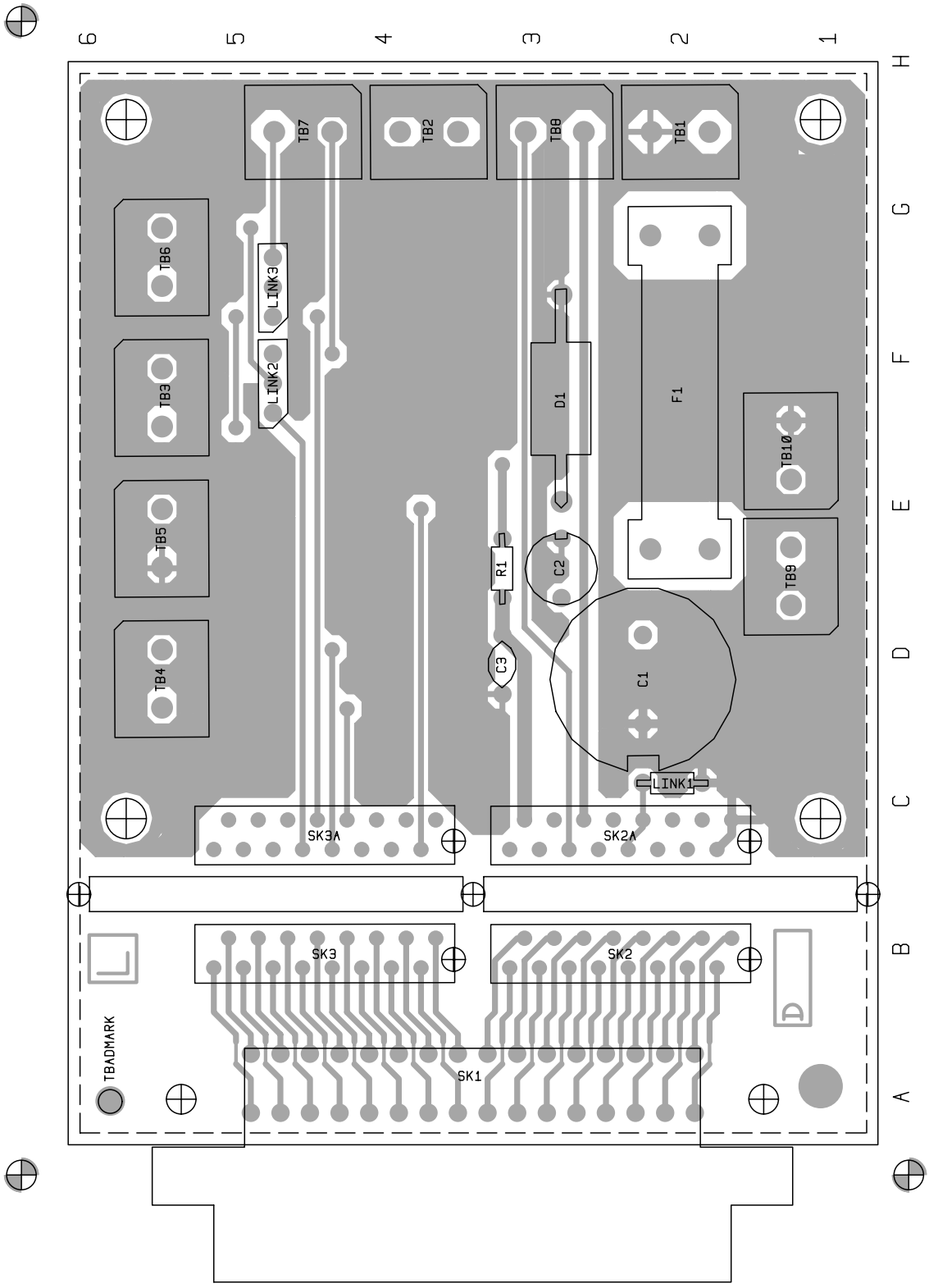


T805-06 Adaptor PCB (IPN 220-01279-00) - Bottom Side



T805-06 Adaptor PCB (IPN 220-01279-00) - Top Side

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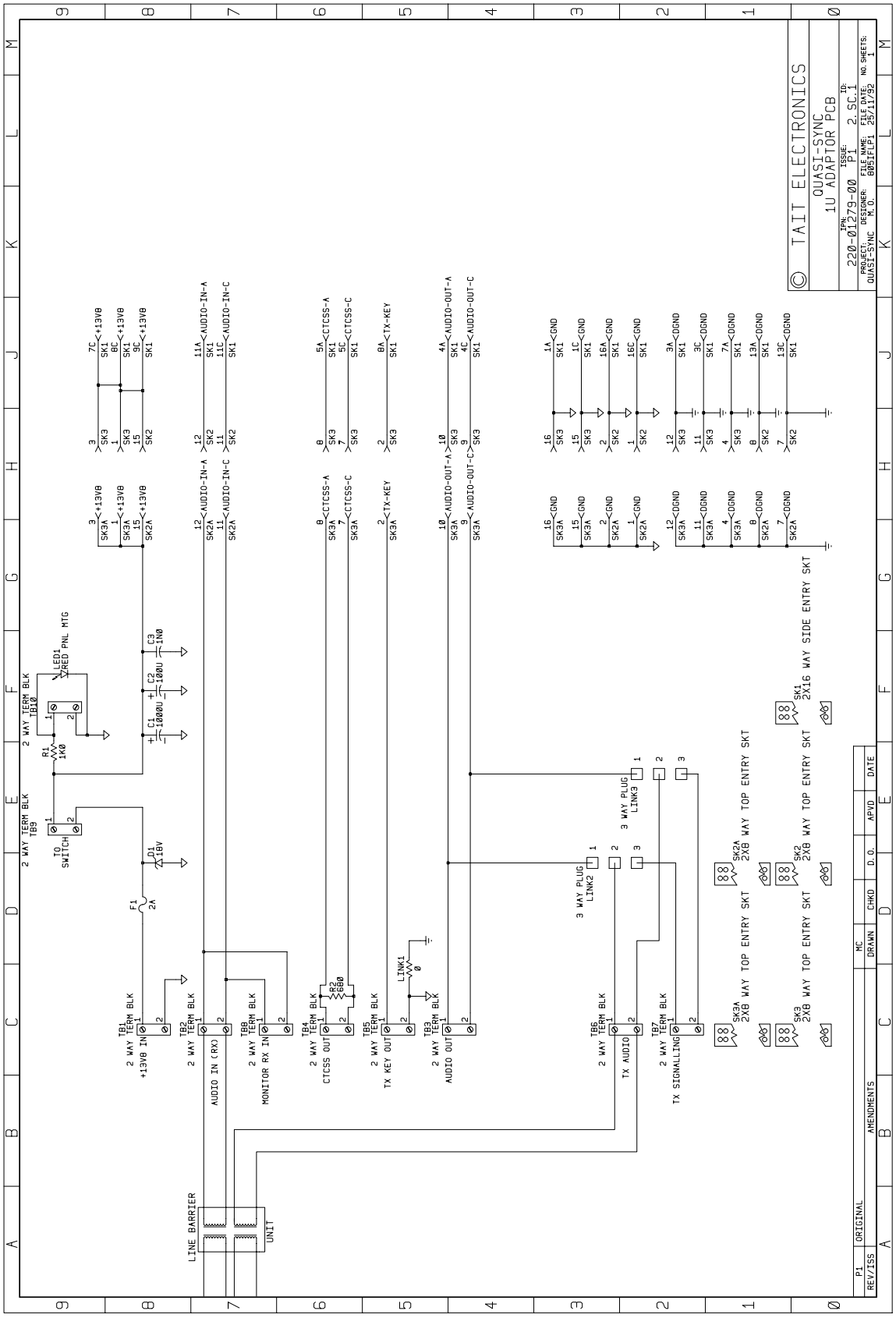

T805-06 Circuit Diagram - 220-01279-00

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T805-06 Parts List (IPN 220-01279-01)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped by component type in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

365-01513-00	Added for FCC requirement (96/07-7103).
R11 & R12	Added because omitted from original parts list (96/09-7157).
P5/SK4/SK4A	Deleted because included in original parts list in error (96/09-7157).

Ref	Var	IPN	Description
C1		020-19100-01	CAP ELECT RADL 1000M 25V 16X25MM
C2		022-56100-10	CAP MYLAR AI 100N 5% 63V POTTED
C3		011-54100-01	CAP CER AI 1N 10% T/C B 63V
D1		001-00012-77	(S) DIODE 1N6277A ZENER 18V 1500W @ 1.0MS
F1		265-00010-46	FUSE 1.5A CARTRIDGE 6*32MM SLOBLOW
LED1		008-00015-02	(S) LED RED COMPL WITH SATEN CHROME BEZE
LINK1		030-50000-20	RES AI ZERO OHM 4X1.6MM
LINK2		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
LINK3		240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
R1		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R2		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R3		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R4		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R5		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R6		030-53680-20	RES FILM AI 680E 5% 0.4W 4X1.6MM
R7		030-53100-20	RES FILM AI 100E 5% 0.4W 4X1.6MM
R8		030-53100-20	RES FILM AI 100E 5% 0.4W 4X1.6MM
R9		030-53100-20	RES FILM AI 100E 5% 0.4W 4X1.6MM
R10		030-53100-20	RES FILM AI 100E 5% 0.4W 4X1.6MM
R11		030-53100-20	RES FILM AI 100E 5% 0.4W 4X1.6MM
R12		030-53100-20	RES FILM AI 100E 5% 0.4W 4X1.6MM
SW1		230-00010-24	SWITCH ROCKER SPST 250V 16A PNL MTG ILLU
SK1		240-02010-89	CONN 32WAY FEM RIGHT-ANGLE DIN41612
SK2		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
SK2A		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
SK3		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
SK3A		240-04020-54	SKT 16 WAY 2X8 PCB MTG MICROMATCH
TB1		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB2		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB3		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB4		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB5		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB6		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB7		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB8		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB9		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.
TB10		240-04030-09	TERMINAL BLOCK PCB MTG 2WAY 5MM PITCH.

Ref	Var	IPN	Description

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T805-06 Mechanical & Miscellaneous Parts (220-01279-01)

IPN	Description
201-00030-02	WIRE #1 T/C WIRE 7/0.2MM PVC RED
201-00030-10	WIRE #1 T/C WIRE 7/0.2MM PVC BLACK
201-00050-02	CABLE AUTO RED 7/0.32MM PVC
205-00010-03	CABLE TWIN CYCLE FLEX 2/7/0.2MM BLACK
205-00010-12	CABLE FLAT RBBN 16 CORE 16/7/0.1 GREY
220-01279-01	PCB QUASI-SYNC 1U ADAPTER
240-00020-54	PLUG 16 WAY 2X8 FLAT CABLE TERMN MICROMATC
240-04020-62	SKT 2 WAY RECEPTL SHORTING LINK
318-01019-01	RACK BIN A2M2799 ONE UNIT
340-00010-06	FUSE CLIP PCB MTG 6.3MM CARTRIDGE FUSE
345-00040-06	SCREW M3*8MM PAN POZI ST BZ
345-00040-11	SCREW M3X10MM PAN POZI ST BZ
352-00010-08	NUT M3 COLD FORM HEX ST BZ
353-00010-11	WASHER M3 FLAT 9.5MM*0.9MM ST BZ
353-00010-13	WASHER M3 SHAKEPROOF INT BZ Audio Power PCB to U Rack
356-00020-06	RECEPTL 6.3MM QUICK CONNECT FLARED INSULAT
360-00010-11	GROMMET FLAT CORD CLAMPING TYPE B
362-00010-13	BUSH INSULATING 1.1MM TOP HAT
365-00100-20	LABEL WHITE S/A 28X11MM QUIKSTIK RW718/4
365-01376-00	LABEL A4A724 SOFTWARE WARNING GUIDE
365-01399-00	LABEL QS BABT APPROVAL
365-01513-00	LABEL FCC CLASS A DIGITAL
369-00010-14	TIE CABLE NYLON 100*2.6MM
369-00010-14	TIE CABLE NYLON 100*2.6MM
369-00010-24	BASE CABLE TIE MTG SELF ADHESIVE
399-00010-51	BAG PLASTIC 75*100MM
400-00020-05	SLEEVING 1.5MM SIL RUBBER
410-01088-00	CRTN T800 SLIMLINE 520X440X150MM
410-01089-00	PKG T801 A3M2806 POLYST FOAM (COMPLETE 6 PI
410-01093-00	PKG T805-06 POLYSTYRENE FOAM 327 X 420 X 45M
428-00002-00	SOFTWARE LICENCE AGREEMENT

IPN	Description

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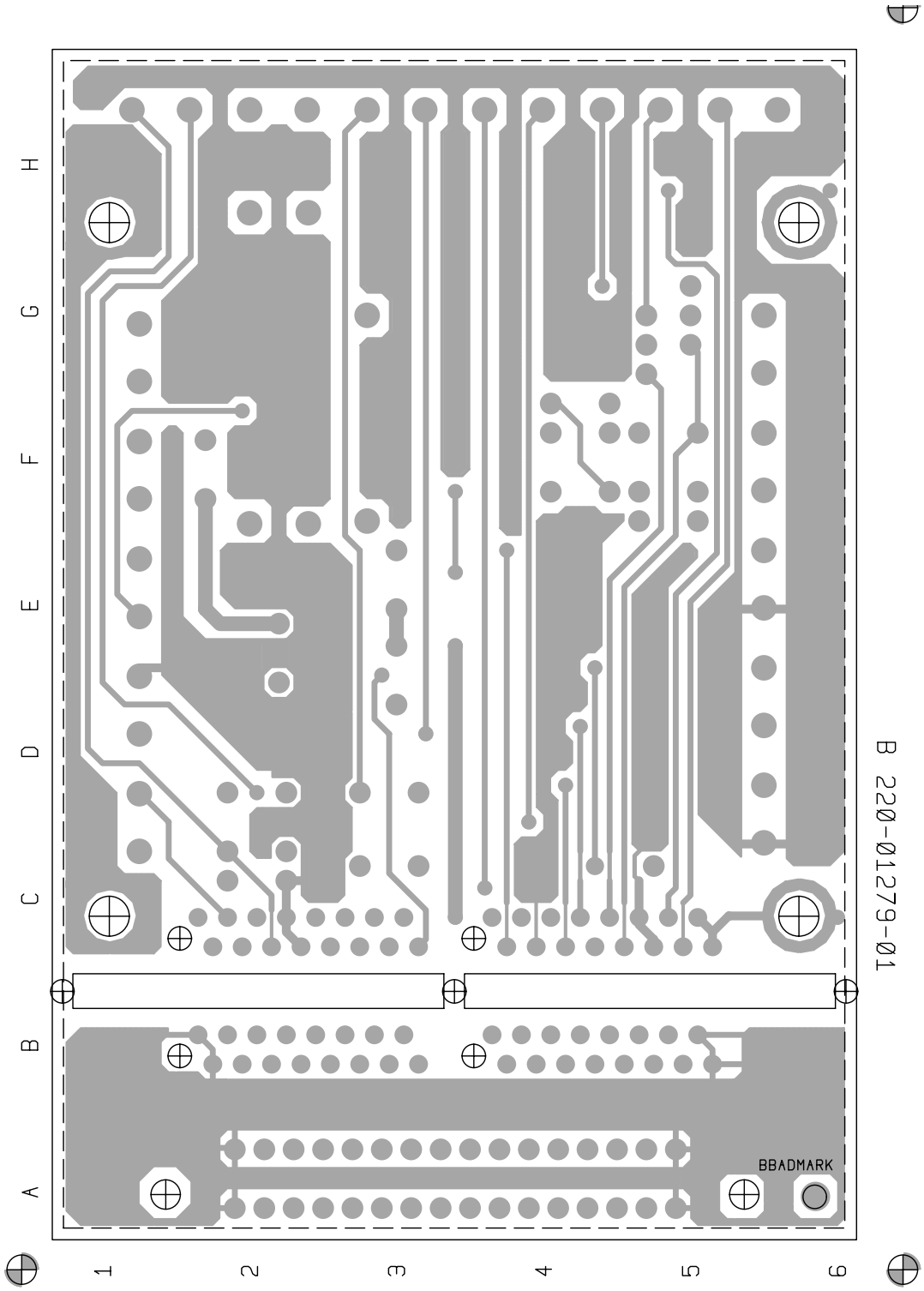
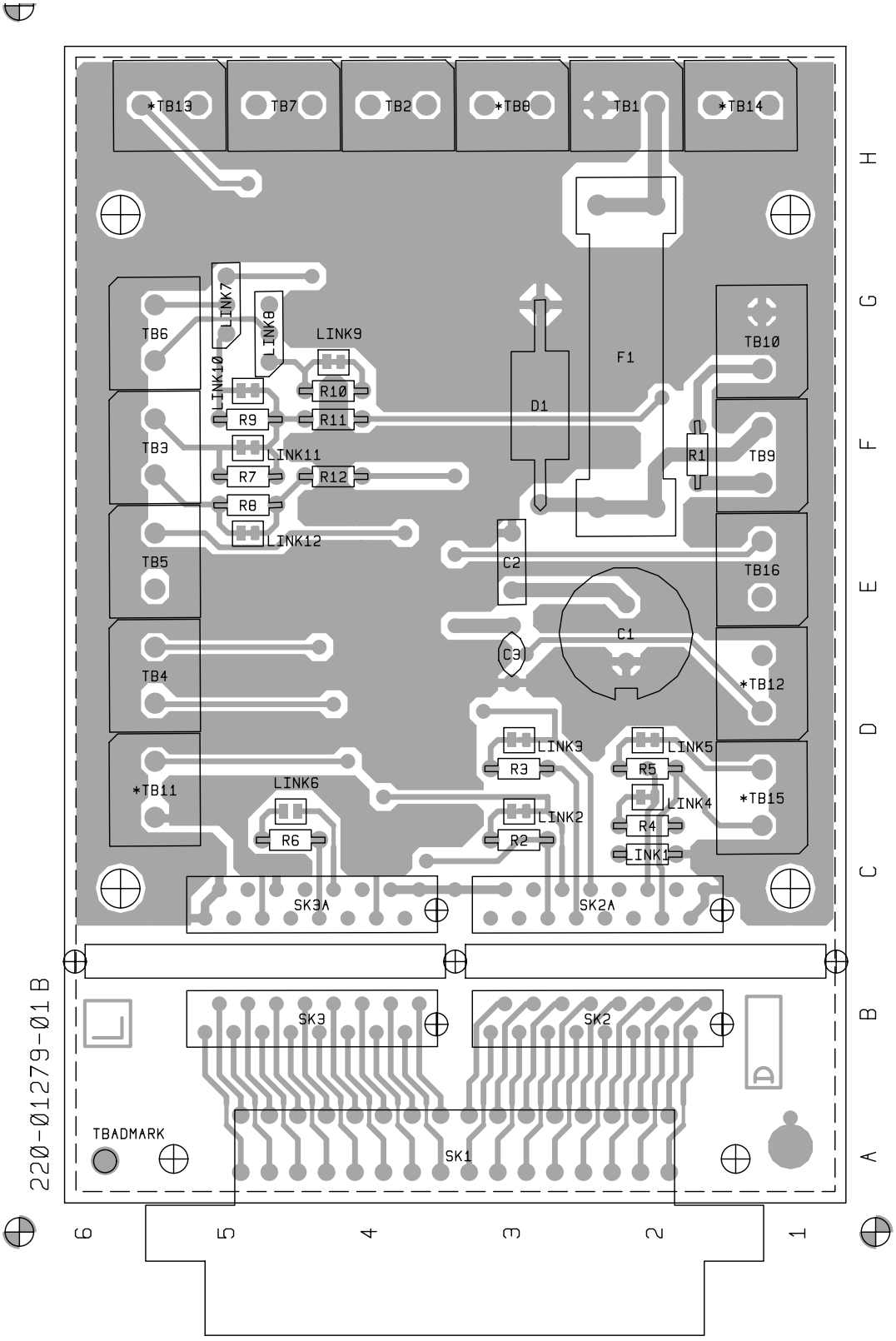


T805-06 Adaptor PCB (IPN 220-01279-01) - Bottom Side



T805-06 Adaptor PCB (IPN 220-01279-01) - Top Side

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14.5 T805 Front Panel PCB

This section contains the following information.

T805 Front Panel PCB Parts List (IPN 220-01354-00)

How To Use This Parts List

The components listed in this parts list are divided into two main types: those with a circuit reference (e.g. C2, D1, R121, etc) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped by component type in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

There were no amendments to the parts list at the time of publication.

Ref	Var	IPN	Description
IC1		002-00017-30	(S) IC 74LS05 HEX OPEN C INVERTER
IC2		002-00017-30	(S) IC 74LS05 HEX OPEN C INVERTER
LED1		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED2		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED3		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED4		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED5		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED6		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED7		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED8		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
LED9		008-00011-52	(S) LED 5MM RED DIFFUSED HI-INTENSITY NO MTG
PL1		240-00020-51	PLUG 12 WAY 2X6 FLAT CABLE TERMN
R1		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R2		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R3		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R4		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R5		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R6		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R7		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R8		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R9		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R10		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R11		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R12		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R13		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R14		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R15		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R16		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
R17		030-55220-20	RES FILM AI 22K 5% 0.4W 4X1.6MM
R18		030-54100-20	RES FILM AI 1K 5% 0.4W 4X1.6MM
SK1		240-04020-51	SKT 12 WAY 2 ROW (2X6) PCB MTG
SW1		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW2		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW3		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW4		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW5		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW6		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW7		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW8		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
SW9		230-00010-32	SWITCH ROCKER SPDT WITH LED HOLDER
		220-01354-00	T805 FRONT PANEL PCB

Ref	Var	IPN	Description

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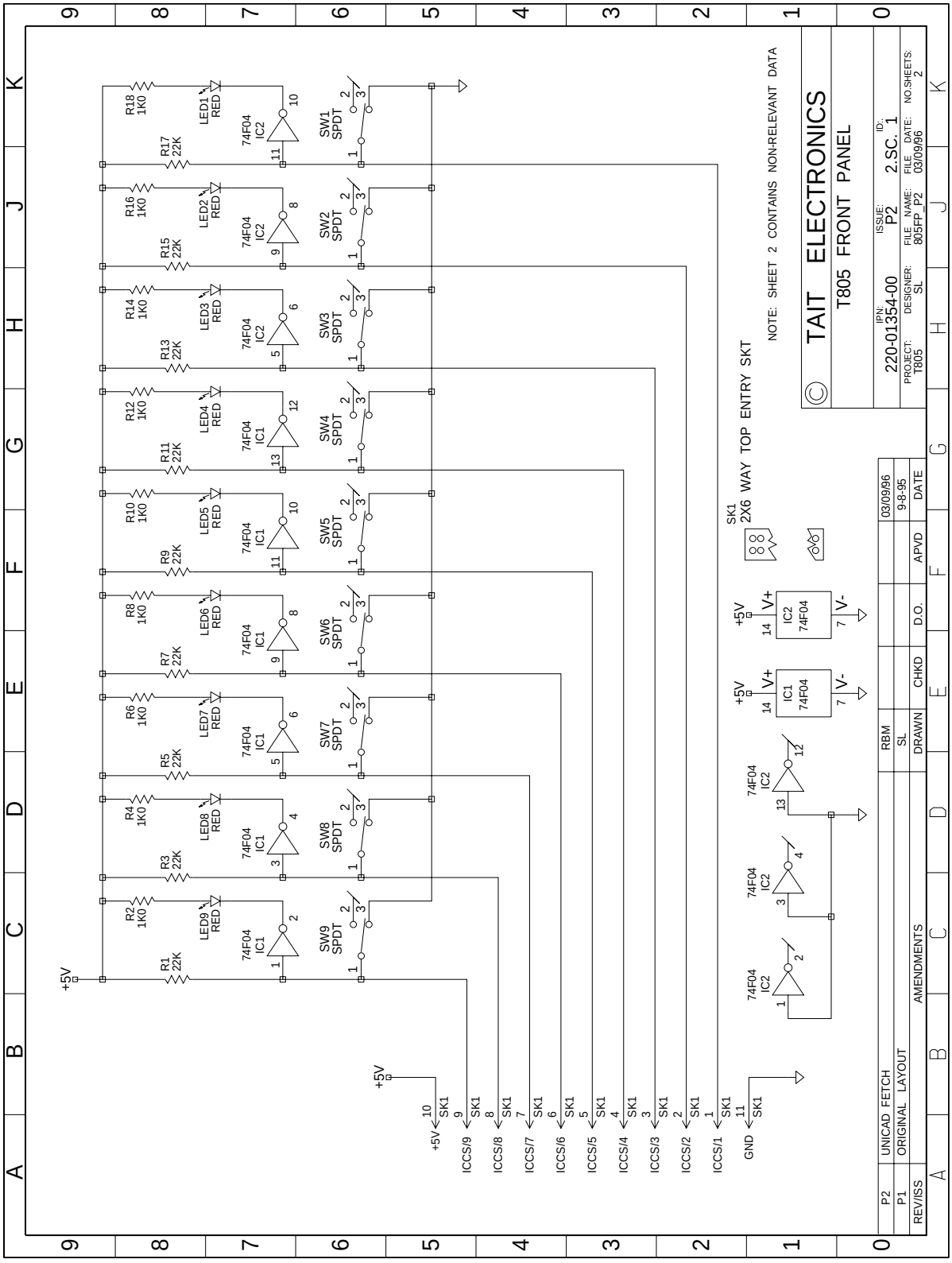

T805 Front Panel PCB Circuit Diagram - 220-01354-00

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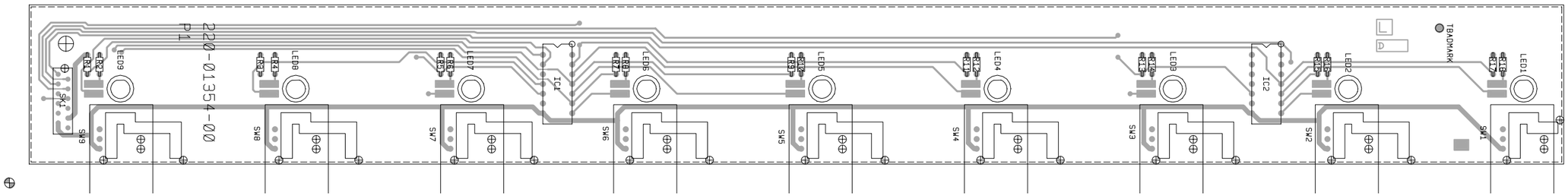

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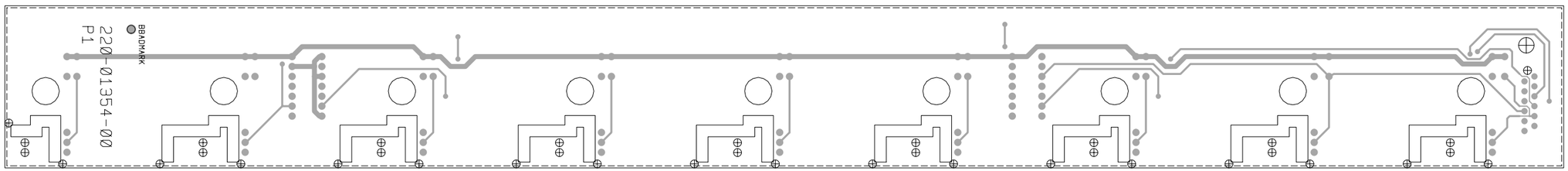
T805 Front Panel PCB Layout - Top Side
220-01354-00



T805 Front Panel PCB Layout - Bottom Side - 220-01354-00

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Appendix A

Glossary Of Terms

Absolute Delay — The time a signal is delayed, measured from when it leaves its source to when it reaches its destination.

ACL-II+ Card — One of two additional cards (the other is a PCL-830 card) fitted into a standard IBM[1] compatible 386 (or better) computer to enable it to operate as a System Controller. The ACL-II+ card provides the RS-485 serial communication between the computer and ASP cards.

AIM — Audio Inversion Module (T805-01). The AIM is used when Quasi-Synchronous transmitters are remotely located and linked to the base site via a land line. Audio in the 67Hz to 2.55kHz band is inverted and shifted around a carrier so that it can be sent down a 300Hz to 3kHz channel. The methods employed also offer immunity to line polarity reversals and amplitude variations of the land line.

Amplitude Response — The variation in amplitude of a signal as its frequency is changed.

ARM — Audio Recovery Module (T805-01). A complement to the AIM.

ASP Card — Audio Signal Processing card. The hardware description for the cards used in the Quasi-Synchronous system. An ASP card can be a TSGM, LEM, AIM or ARM depending on the software used.

Breakout Mode — The mode that a LEM / transmitter combination may be put into if it is required to work outside the Quasi-Synchronous system. The audio information transmitted by this combination will be different to that which is being transmitted by the Quasi-Synchronous system.

Card ID — A number in the range 0-255 which is used to uniquely identify a card. An LEM may be in the range 0-222 while a TSGM has the address in the range 223-238.

Controlling System — The (host) system to which the Quasi-Synchronous system is connected.

1. IBM is a registered trade-mark of International Business Machines Ltd.

CTCSS Continuous Tone Controlled Squelch System. A signalling method used to key selected receivers operating on the same RF frequency. Typically operated in the 67- 250.3Hz frequency range.

CYFAS A company in England specialising in line signalling. Their line barrier units are often used with the AIM and ARM cards.

GPS A term used to describe the timing pulse generated by the TSGM during training.

Group A combination of 32 TSGM(s) and LEM(s) communicating with the System Controller via a port on the ACL-II card.

Group Delay The frequency dependent time delay applied to a signal being passed through a system of a given transfer characteristic.

HF Training Audio The audio signals used for training/equalising the LEMs, occupying the 300-2850Hz band.

ICCS A term used to describe a proprietary digital cross-over switch which is used to transmit audio over a digital link.

Inversion Mode The most common operating mode of an AIM when in use. The audio passed into it is mixed around a carrier and thus baseband shifted. This mode is used so that signals in the 67-300Hz frequency range may be passed down a land line (which has a very poor frequency response below 300Hz).

Land Line A means of linking communications between two physically separated sites using a Telecom link.

LEM Line Equaliser Module (T805-02). The module that performs the audio equalisation required to operate a transmitter in the Tait Quasi-Synchronous system.

LF Training Audio The audio signals used for training/equalising the LEMs, occupying the 45-300Hz band.

Line Reversals Reversals of line polarity resulting in a 180° phase shift of the audio signal.

Master Controller The controller of the controlling system, typically connected to the PC Controller, with some control signals connected to the TSGM. When an AIM/ARM combination is used, it must also be capable of generating a 2970Hz tone down the speech audio path to signal the ARMs to key their transmitters.

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Microwave Link — An alternative to the land line, this link uses a microwave transmitter/receiver arrangement to connect the two sites.

Monitor Receiver — The (RF) receiver used in the training process for equalisation of the LEMs.

Network — A combination of TSGMs (either 1 or 2) LEMs and their associated transmitters form a Quasi-Synchronous network. Up to 222 LEM combinations may make up to 8 networks. Normally a new network involves starting a new group as well.

PCL-830 Card — One of two additional cards (the other is an ACL-II+ card) fitted into a standard IBM compatible 386 (or better) computer to enable it to operate as a System Controller. The PCL-830 performs timing functions and provides an I/O interface for the computer.

PCM — Pulse Coded Modulation. A protocol used to transmit information in digital format from one point to another.

Quasi-Synchronous System — A system with multiple transmitters on the same frequency whose transmission areas may overlap. Another name for Simulcast system.

Recovery Mode — The most common operating mode of an ARM when in use. Used to reverse the process carried out in an AIM.

RIC — A single unit in an ICCS system which performs the A/D conversion and passes the data onto the digital transmission link. It is also capable of converting a digital signal back to audio via a D/A convertor.

RS-485 Communications — A communications system, similar to RS-422 or RS-232, but with greater flexibility and range.

Simulcast System — A system with multiple transmitters on the same frequency whose transmission areas may overlap. Another term for Quasi-Synchronous system.

Speech Audio — The audio passed into the Quasi-Synchronous system when in normal operation. It is the information transmitted to the mobiles in the area covered by the Quasi-Synchronous system and occupies the frequency range 300-2550Hz.

System Controller — The computer (IBM compatible 386 or better) used to control the T805 Quasi-Synchronous system.

Training Mode — The mode the Quasi-Synchronous system enters when the equalisation calculation process occurs. It

	compensates for the differences in absolute delay, group delay and amplitude variations that occur as the speech audio is passed to the transmitters in the Quasi-Synchronous system.
TSGM	Test Signal Generator Module (T805-03). The unit that provides the training signals which the LEMs use to equalise their path in the Quasi-Synchronous system.
Voting	Testing the RF signal strength of received signals to determine which is strongest.

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Appendix B

Decimal-Hex-Binary Conversion Table

Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
1	01	1	0	0	0	0	0	0	0
2	02	0	1	0	0	0	0	0	0
3	03	1	1	0	0	0	0	0	0
4	04	0	0	1	0	0	0	0	0
5	05	1	0	1	0	0	0	0	0
6	06	0	1	1	0	0	0	0	0
7	07	1	1	1	0	0	0	0	0
8	08	0	0	0	1	0	0	0	0
9	09	1	0	0	1	0	0	0	0
10	0A	0	1	0	1	0	0	0	0
11	0B	1	1	0	1	0	0	0	0
12	0C	0	0	1	1	0	0	0	0
13	0D	1	0	1	1	0	0	0	0
14	0E	0	1	1	1	0	0	0	0
15	0F	1	1	1	1	0	0	0	0
16	10	0	0	0	0	1	0	0	0
17	11	1	0	0	0	1	0	0	0
18	12	0	1	0	0	1	0	0	0
19	13	1	1	0	0	1	0	0	0
20	14	0	0	1	0	1	0	0	0
21	15	1	0	1	0	1	0	0	0
22	16	0	1	1	0	1	0	0	0

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
23	17	1	1	1	0	1	0	0	0
24	18	0	0	0	1	1	0	0	0
25	19	1	0	0	1	1	0	0	0
26	1A	0	1	0	1	1	0	0	0
27	1B	1	1	0	1	1	0	0	0
28	1C	0	0	1	1	1	0	0	0
29	1D	1	0	1	1	1	0	0	0
30	1E	0	1	1	1	1	0	0	0
31	1F	1	1	1	1	1	0	0	0
32	20	0	0	0	0	0	1	0	0
33	21	1	0	0	0	0	1	0	0
34	22	0	1	0	0	0	1	0	0
35	23	1	1	0	0	0	1	0	0
36	24	0	0	1	0	0	1	0	0
37	25	1	0	1	0	0	1	0	0
38	26	0	1	1	0	0	1	0	0
39	27	1	1	1	0	0	1	0	0
40	28	0	0	0	1	0	1	0	0
41	29	1	0	0	1	0	1	0	0
42	2A	0	1	0	1	0	1	0	0
43	2B	1	1	0	1	0	1	0	0
44	2C	0	0	1	1	0	1	0	0
45	2D	1	0	1	1	0	1	0	0
46	2E	0	1	1	1	0	1	0	0
47	2F	1	1	1	1	0	1	0	0
48	30	0	0	0	0	1	1	0	0
49	31	1	0	0	0	1	1	0	0

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

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Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
50	32	0	1	0	0	1	1	0	0
51	33	1	1	0	0	1	1	0	0
52	34	0	0	1	0	1	1	0	0
53	35	1	0	1	0	1	1	0	0
54	36	0	1	1	0	1	1	0	0
55	37	1	1	1	0	1	1	0	0
56	38	0	0	0	1	1	1	0	0
57	39	1	0	0	1	1	1	0	0
58	3A	0	1	0	1	1	1	0	0
59	3B	1	1	0	1	1	1	0	0
60	3C	0	0	1	1	1	1	0	0
61	3D	1	0	1	1	1	1	0	0
62	3E	0	1	1	1	1	1	0	0
63	3F	1	1	1	1	1	1	0	0
64	40	0	0	0	0	0	0	1	0
65	41	1	0	0	0	0	0	1	0
66	42	0	1	0	0	0	0	1	0
67	43	1	1	0	0	0	0	1	0
68	44	0	0	1	0	0	0	1	0
69	45	1	0	1	0	0	0	1	0
70	46	0	1	1	0	0	0	1	0
71	47	1	1	1	0	0	0	1	0
72	48	0	0	0	1	0	0	1	0
73	49	1	0	0	1	0	0	1	0
74	4A	0	1	0	1	0	0	1	0
75	4B	1	1	0	1	0	0	1	0
76	4C	0	0	1	1	0	0	1	0

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
77	4D	1	0	1	1	0	0	1	0
78	4E	0	1	1	1	0	0	1	0
79	4F	1	1	1	1	0	0	1	0
80	50	0	0	0	0	1	0	1	0
81	51	1	0	0	0	1	0	1	0
82	52	0	1	0	0	1	0	1	0
83	53	1	1	0	0	1	0	1	0
84	54	0	0	1	0	1	0	1	0
85	55	1	0	1	0	1	0	1	0
86	56	0	1	1	0	1	0	1	0
87	57	1	1	1	0	1	0	1	0
88	58	0	0	0	1	1	0	1	0
89	59	1	0	0	1	1	0	1	0
90	5A	0	1	0	1	1	0	1	0
91	5B	1	1	0	1	1	0	1	0
92	5C	0	0	1	1	1	0	1	0
93	5D	1	0	1	1	1	0	1	0
94	5E	0	1	1	1	1	0	1	0
95	5F	1	1	1	1	1	0	1	0
96	60	0	0	0	0	0	1	1	0
97	61	1	0	0	0	0	1	1	0
98	62	0	1	0	0	0	1	1	0
99	63	1	1	0	0	0	1	1	0
100	64	0	0	1	0	0	1	1	0
101	65	1	0	1	0	0	1	1	0
102	66	0	1	1	0	0	1	1	0
103	67	1	1	1	0	0	1	1	0

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

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Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
104	68	0	0	0	1	0	1	1	0
105	69	1	0	0	1	0	1	1	0
106	6A	0	1	0	1	0	1	1	0
107	6B	1	1	0	1	0	1	1	0
108	6C	0	0	1	1	0	1	1	0
109	6D	1	0	1	1	0	1	1	0
110	6E	0	1	1	1	0	1	1	0
111	6F	1	1	1	1	0	1	1	0
112	70	0	0	0	0	1	1	1	0
113	71	1	0	0	0	1	1	1	0
114	72	0	1	0	0	1	1	1	0
115	73	1	1	0	0	1	1	1	0
116	74	0	0	1	0	1	1	1	0
117	75	1	0	1	0	1	1	1	0
118	76	0	1	1	0	1	1	1	0
119	77	1	1	1	0	1	1	1	0
120	78	0	0	0	1	1	1	1	0
121	79	1	0	0	1	1	1	1	0
122	7A	0	1	0	1	1	1	1	0
123	7B	1	1	0	1	1	1	1	0
124	7C	0	0	1	1	1	1	1	0
125	7D	1	0	1	1	1	1	1	0
126	7E	0	1	1	1	1	1	1	0
127	7F	1	1	1	1	1	1	1	0
128	80	0	0	0	0	0	0	0	1
129	81	1	0	0	0	0	0	0	1
130	82	0	1	0	0	0	0	0	1

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

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Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
131	83	1	1	0	0	0	0	0	1
132	84	0	0	1	0	0	0	0	1
133	85	1	0	1	0	0	0	0	1
134	86	0	1	1	0	0	0	0	1
135	87	1	1	1	0	0	0	0	1
136	88	0	0	0	1	0	0	0	1
137	89	1	0	0	1	0	0	0	1
138	8A	0	1	0	1	0	0	0	1
139	8B	1	1	0	1	0	0	0	1
140	8C	0	0	1	1	0	0	0	1
141	8D	1	0	1	1	0	0	0	1
142	8E	0	1	1	1	0	0	0	1
143	8F	1	1	1	1	0	0	0	1
144	90	0	0	0	0	1	0	0	1
145	91	1	0	0	0	1	0	0	1
146	92	0	1	0	0	1	0	0	1
147	93	1	1	0	0	1	0	0	1
148	94	0	0	1	0	1	0	0	1
149	95	1	0	1	0	1	0	0	1
150	96	0	1	1	0	1	0	0	1
151	97	1	1	1	0	1	0	0	1
152	98	0	0	0	1	1	0	0	1
153	99	1	0	0	1	1	0	0	1
154	9A	0	1	0	1	1	0	0	1
155	9B	1	1	0	1	1	0	0	1
156	9C	0	0	1	1	1	0	0	1
157	9D	1	0	1	1	1	0	0	1

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

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Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
158	9E	0	1	1	1	1	0	0	1
159	9F	1	1	1	1	1	0	0	1
160	A0	0	0	0	0	0	1	0	1
161	A1	1	0	0	0	0	1	0	1
162	A2	0	1	0	0	0	1	0	1
163	A3	1	1	0	0	0	1	0	1
164	A4	0	0	1	0	0	1	0	1
165	A5	1	0	1	0	0	1	0	1
166	A6	0	1	1	0	0	1	0	1
167	A7	1	1	1	0	0	1	0	1
168	A8	0	0	0	1	0	1	0	1
169	A9	1	0	0	1	0	1	0	1
170	AA	0	1	0	1	0	1	0	1
171	AB	1	1	0	1	0	1	0	1
172	AC	0	0	1	1	0	1	0	1
173	AD	1	0	1	1	0	1	0	1
174	AE	0	1	1	1	0	1	0	1
175	AF	1	1	1	1	0	1	0	1
176	B0	0	0	0	0	1	1	0	1
177	B1	1	0	0	0	1	1	0	1
178	B2	0	1	0	0	1	1	0	1
179	B3	1	1	0	0	1	1	0	1
180	B4	0	0	1	0	1	1	0	1
181	B5	1	0	1	0	1	1	0	1
182	B6	0	1	1	0	1	1	0	1
183	B7	1	1	1	0	1	1	0	1
184	B8	0	0	0	1	1	1	0	1

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
185	B9	1	0	0	1	1	1	0	1
186	BA	0	1	0	1	1	1	0	1
187	BB	1	1	0	1	1	1	0	1
188	BC	0	0	1	1	1	1	0	1
189	BD	1	0	1	1	1	1	0	1
190	BE	0	1	1	1	1	1	0	1
191	BF	1	1	1	1	1	1	0	1
192	C0	0	0	0	0	0	0	1	1
193	C1	1	0	0	0	0	0	1	1
194	C2	0	1	0	0	0	0	1	1
195	C3	1	1	0	0	0	0	1	1
196	C4	0	0	1	0	0	0	1	1
197	C5	1	0	1	0	0	0	1	1
198	C6	0	1	1	0	0	0	1	1
199	C7	1	1	1	0	0	0	1	1
200	C8	0	0	0	1	0	0	1	1
201	C9	1	0	0	1	0	0	1	1
202	CA	0	1	0	1	0	0	1	1
203	CB	1	1	0	1	0	0	1	1
204	CC	0	0	1	1	0	0	1	1
205	CD	1	0	1	1	0	0	1	1
206	CE	0	1	1	1	0	0	1	1
207	CF	1	1	1	1	0	0	1	1
208	D0	0	0	0	0	1	0	1	1
209	D1	1	0	0	0	1	0	1	1
210	D2	0	1	0	0	1	0	1	1
211	D3	1	1	0	0	1	0	1	1

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

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Decimal	Hex	Binary							
		D0	D1	D2	D3	D4	D5	D6	D7
212	D4	0	0	1	0	1	0	1	1
213	D5	1	0	1	0	1	0	1	1
214	D6	0	1	1	0	1	0	1	1
215	D7	1	1	1	0	1	0	1	1
216	D8	0	0	0	1	1	0	1	1
217	D9	1	0	0	1	1	0	1	1
218	DA	0	1	0	1	1	0	1	1
219	DB	1	1	0	1	1	0	1	1
220	DC	0	0	1	1	1	0	1	1
221	DD	1	0	1	1	1	0	1	1
222	DE	0	1	1	1	1	0	1	1

Note: Depending on the type of switch used:

if a switch is pushed down in the position labelled "OFF", it is at logic 1;

or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

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