M805-00 Revision Package

IPN R805-00-102

5/11/96

Introduction

Revision package R805-00-102 is the second update to M805-00 A0.

This revision package contains:

- additional information on one updated PCB (the T805-04 backplane PCB IPN 220-01254-04)
- additional information on one new PCB (the T805 front panel PCB IPN 220-01354-00)
- revisions to most sections in the manual to bring them up to date and provide additional information.

The List of Effective Pages and Tables Of Contents have also been updated to reflect these changes.

Contents

You can update your M805-00-101 to revision 102 status by substituting or adding these Revision Package pages as instructed in the following table:

Section	Revision Package Page Numbers	Pages To Replace	Add In Sequence After Page
TOC / LEP	1 to 8	1 to 8	—
1	1.5 to 1.8	1.5 to 1.8	—
4	4.1 to 4.10	4.1 to 4.10	—
5	5.3 to 5.4	5.3 to 5.4	—
7	7.1 to 7.18	7.1 to 7.16	—
8	8.5 to 8.12	8.5 to 8.12	—
9	9.13 to 9.14	9.13 to 9.14	—
10	10.3 to 10.6 10.11 to 10.18	10.3 to 10.6 10.11 to 10.18	— —
13	13.3 to 13.4	13.3 to 13.4	—

Section	Revision Package Page Numbers	Pages To Replace	Add In Sequence After Page
14.1	14.1.1 to 14.1.2	14.1.1 to 14.1.2	—
14.2	14.2.1 to 14.2.2	14.2.1 to 14.2.2	—
14.3	14.3.1 to 14.3.2 14.3.13 to 14.3.22	14.3.1 to 14.3.2 —	— 14.3.12
14.4	14.4.9 to 14.4.10	14.4.9 to 14.4.10	—
14.5	14.5.1 to 14.5.6	—	14.4.14
App. A	A1 to A4	A1 to A4	—

Additional Revision Packages

Additional revision packages should be ordered from your nearest Tait branch or approved dealer. Quote the Tait Internal Part Number (IPN R805-00-102) when ordering.

T805 Quasi-Synchronous Transmission System Service Manual

Issue 102

October 1996

M805-00-102

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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.

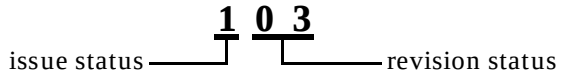
If you return the address card at the front of this manual, you will be notified when revision packages containing new PCB information and/or text are available. You may then order as many packages as you require from your local Tait Company. Revision packages are supplied ready-punched for inclusion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

IPN M805-00-102 T805 Quasi-Synchronous Transmission System Service Manual

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Issue 101 published June 1995
Issue 102 published October 1996

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This manual is divided into 14 Sections and two Appendices, as listed below. There is a detailed table of contents at the start of each Section.

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1	General Information
2	System Description
3	Circuit Operation
4	ASP Card Operation
5	Quasi-Synchronous Operation With Audio Distribution Networks
6	Introduction To Servicing
7	Initial Programming & Adjustment
8	Functional Tests
9	Fault Finding
10	T805-04 Backplane
11	T805-06 1U Rack
12	T805 System Controller
13	Commissioning Tests
14	PCB Information
Appendix A	Glossary Of Terms
Appendix B	Decimal-Hex-Binary Conversion Table

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1.4	30/04/95	4.7	30/09/96	
1.5	30/09/96	4.8	30/09/96	
1.6	30/09/96	4.9	30/09/96	
1.7	30/09/96	4.10	30/09/96	
1.8	30/04/95			
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1.12	30/04/95	5.4	30/09/96	
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1.16	30/04/95	6.1	30/04/95	
1.17	30/04/95	6.2	blank	
1.18	blank	6.3	30/04/95	
		6.4	30/04/95	
2.1	30/04/95	6.5	30/04/95	
2.2	blank	6.6	30/04/95	
2.3	30/04/95	6.7	30/04/95	
2.4	30/04/95	6.8	blank	
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8.4	30/04/95		11.1	30/04/95	
8.5	30/09/96		11.2	blank	
8.6	30/04/95		11.3	30/04/95	
8.7	30/09/96		11.4	30/04/95	
8.8	30/09/96		11.5	30/04/95	
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9.3	30/04/95		13.1	30/04/95	
9.4	30/04/95		13.2	blank	
9.5	30/04/95		13.3	30/04/95	
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9.7	30/04/95		13.5	30/04/95	
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9.9	30/04/95				
9.10	30/04/95		14.1.1	30/09/96	
9.11	30/04/95		14.1.2	blank	
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9.17	30/04/95		14.2.4	30/04/95	
9.18	30/04/95		14.2.5	30/04/95	
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10.7	30/04/95		14.2.15	30/04/95	(fold-out)
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10.10	30/04/95		14.3.2	30/04/95	
10.11	30/09/96		14.3.3	30/04/95	
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14.3.8	30/04/95			
14.3.9	30/04/95	(fold-out)		
14.3.10	30/04/95	(fold-out)		
14.3.11	30/04/95	(fold-out)		
14.3.12	30/04/95	(fold-out)		
14.3.13	30/09/96			
14.3.14	30/09/96			
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14.3.18	30/09/96			
14.3.19	30/09/96	(fold-out)		
14.3.20	30/09/96	(fold-out)		
14.3.21	30/09/96	(fold-out)		
14.3.22	30/09/96	(fold-out)		
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14.4.2	30/04/95			
14.4.3	30/04/95			
14.4.4	blank			
14.4.5	30/04/95			
14.4.6	30/04/95			
14.4.7	30/04/95			
14.4.8	blank			
14.4.9	30/09/96			
14.4.10	30/09/96			
14.4.11	30/04/95			
14.4.12	30/04/95			
14.4.13	30/04/95	(fold-out)		
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14.5.2	30/09/96			
14.5.3	blank			
14.5.4	30/09/96			
14.5.5	30/09/96	(fold-out)		
14.5.6	30/09/96	(fold-out)		
A1	30/09/96			
A2	30/09/96			
A3	30/09/96			
A4	30/09/96			
B1	30/04/95			
B2	30/04/95			
B3	30/04/95			
B4	30/04/95			
B5	30/04/95			
B6	30/04/95			
B7	30/04/95			
B8	30/04/95			

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)

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])

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.

Section	Title	Page
4.1	**T805-03 Test Signal Generator Module (TSGM)**	**4.3**
4.2	**T805-02 Line Equaliser Module (LEM)**	**4.6**
4.3	**T805-01 Audio Inversion And Recovery Modules (AIM & ARM)**	**4.7**
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4.3.2.1	Remote Mode	4.9
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Figure	Title	Page
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4.2	LEM Block Diagram	4.6
4.3	AIM Block Diagram	4.7
4.4	Example Of Signals Fed Into An AIM	4.8
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4.6	ARM Block Diagram	4.9
4.7	ARM Operation When In Remote Recovery Mode	4.10

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4.1	Assignment Of TSGM IDs According To Network	4.5

4.1 T805-03 Test Signal Generator Module (TSGM)

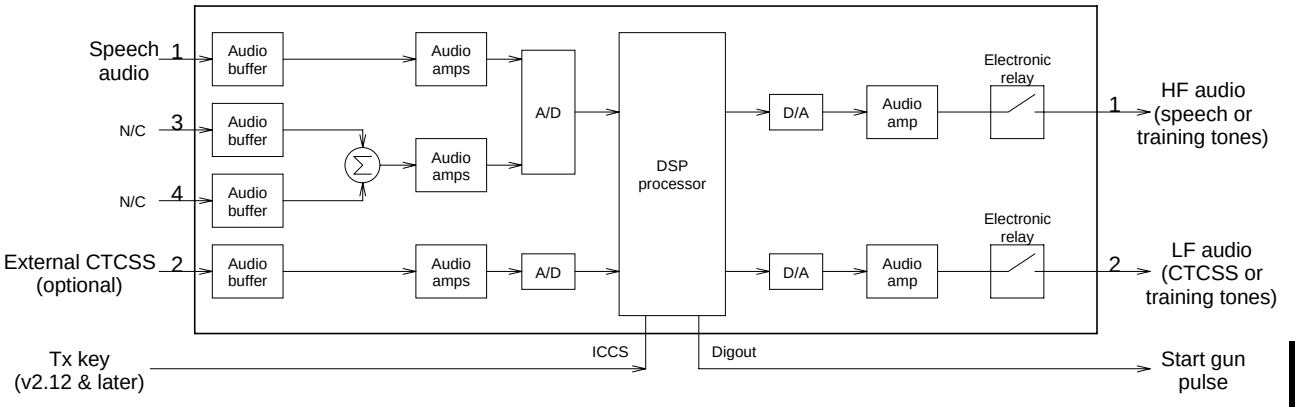

Figure 4.1 TSGM Block Diagram

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.

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)

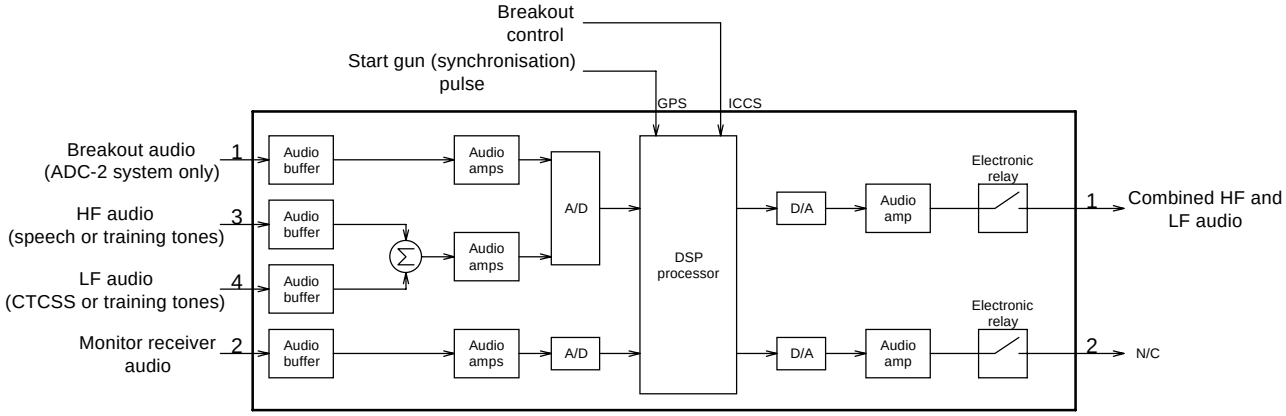

Figure 4.2 LEM Block Diagram

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.

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)

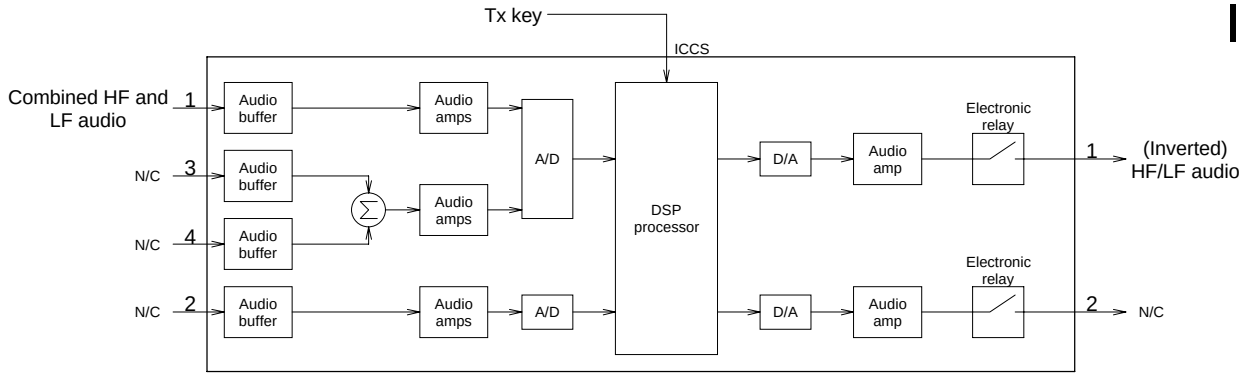

Figure 4.3 AIM Block Diagram

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.

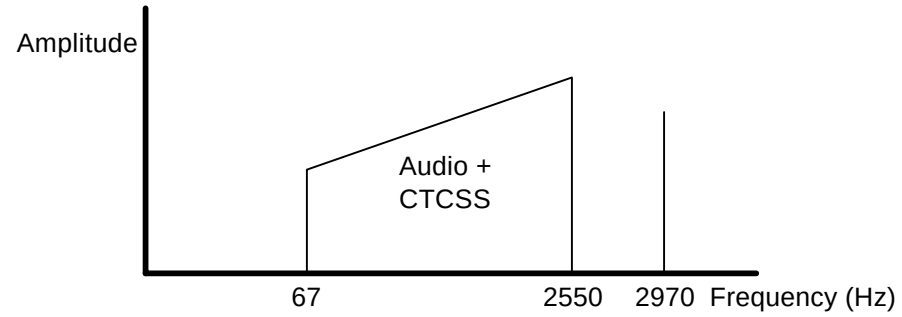

Figure 4.4 Example Of Signals Fed Into An AIM

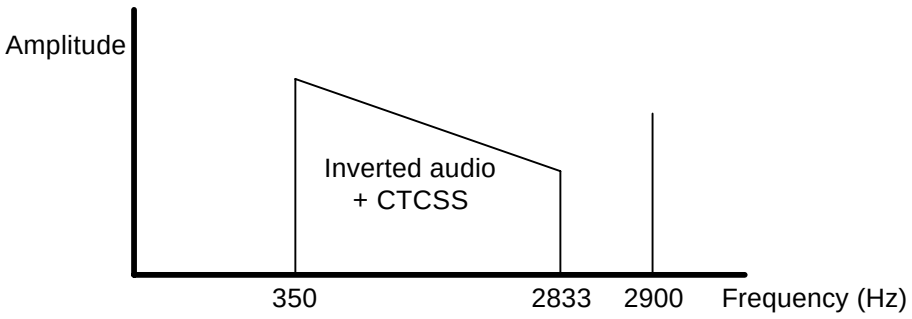

Figure 4.5 Example Of Inverted Signals Output From An AIM

1

4.3.1.2 Remote Mode

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

4.3.2 T805-01 Audio Recovery Module (ARM)

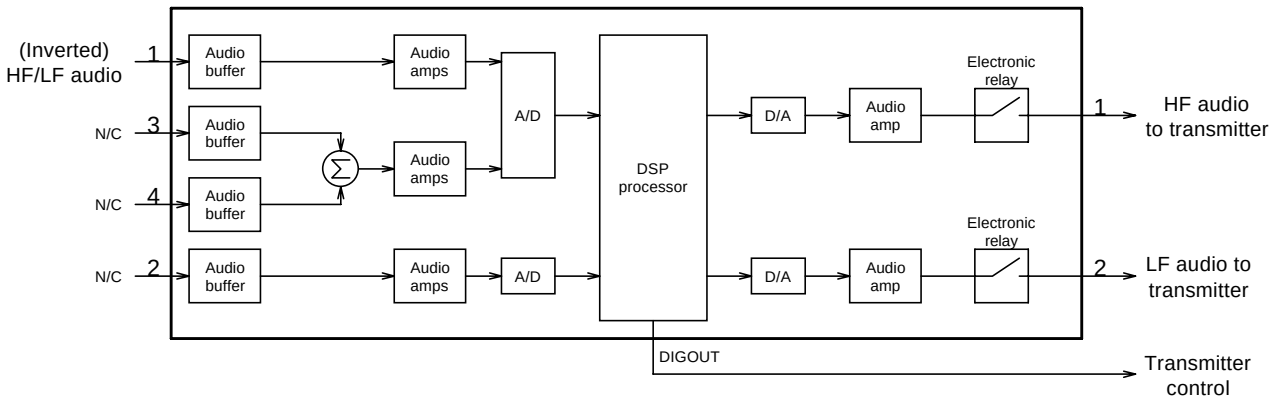

Figure 4.6 ARM Block Diagram

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.

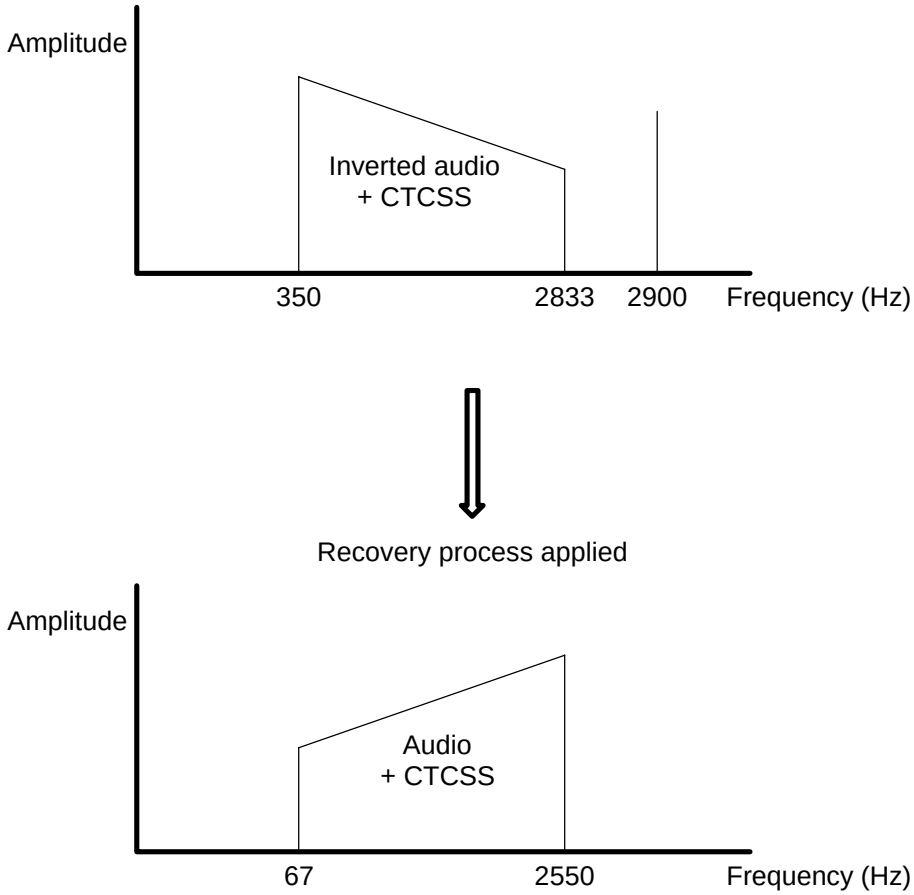

Figure 4.7 ARM Operation When In Remote Recovery Mode

1

4.3.2.2 Local Mode

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

5.1 Operation With Audio Distribution Network Type 1

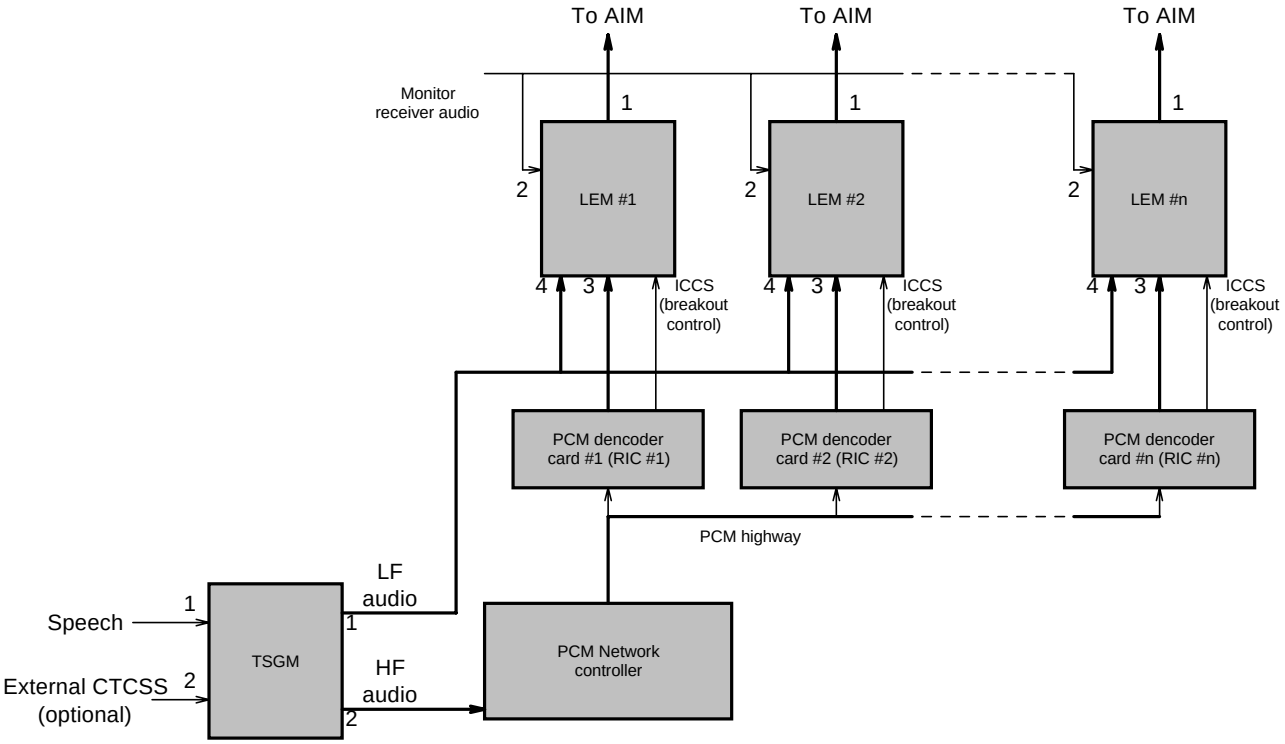

Figure 5.1 Block Diagram Of Audio Distribution Network Type 1

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.

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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7.1.3	TSGM	7.8
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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.

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)

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.

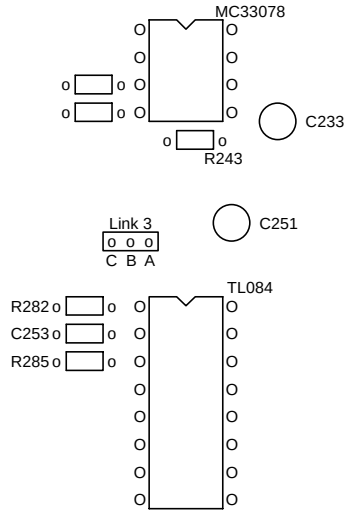


Figure 7.1 Jumper Positions For Link 3 On The ASP Card

7.1.3.3 Line Levels

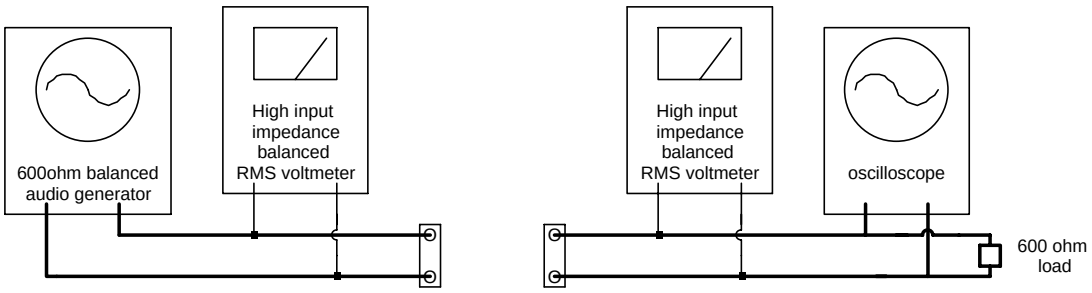


Figure 7.2 Test Equipment Set-up

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.

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.

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.

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.

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

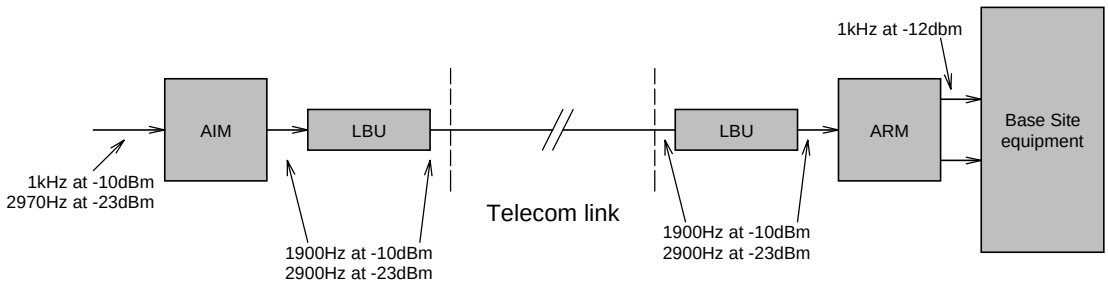


Figure 7.3 AIM/ARM Input And Output Levels

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.

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.

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.

- **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.

- 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.

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

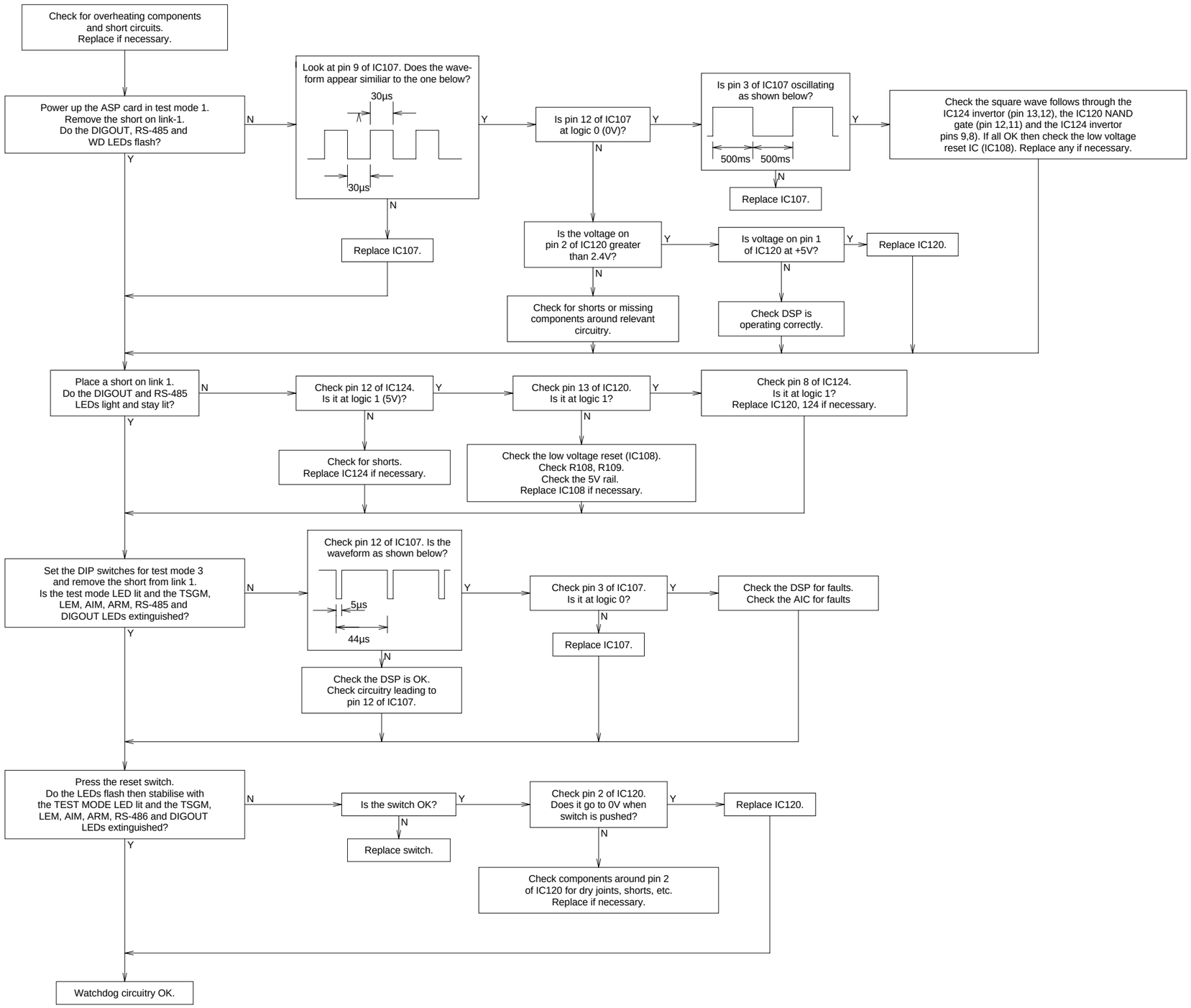
1	0	1	0	1	0	1	0
D8	D9	D10	D11	D12	D13	D14	D15

Note: Depending on the type of switch used:

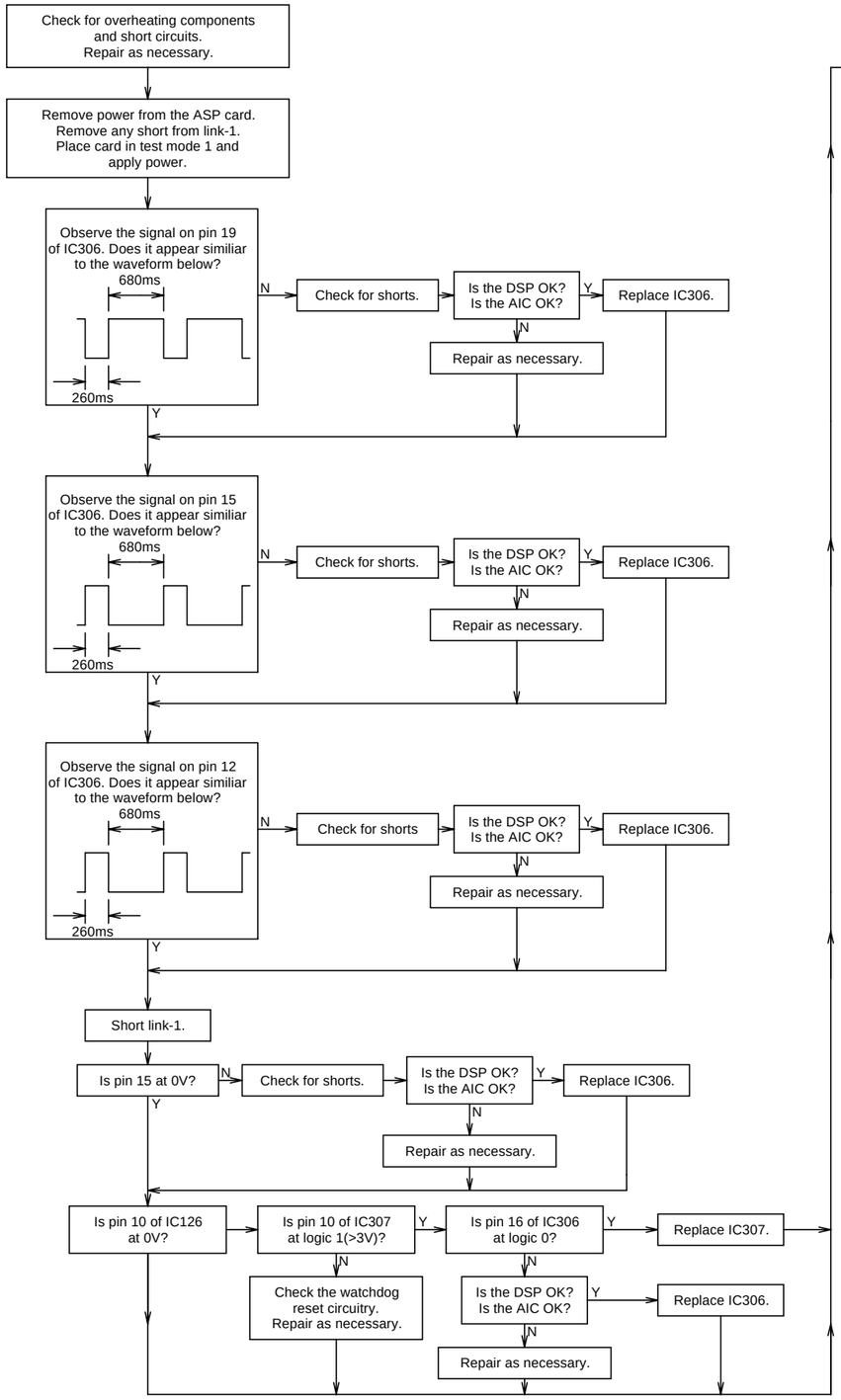
if a switch is pushed down in the position labelled "OFF", it is at logic 1;
or if the switch is pushed towards the LED indicators on the ASP card to the "OFF" position, the bit value is a logic 1.

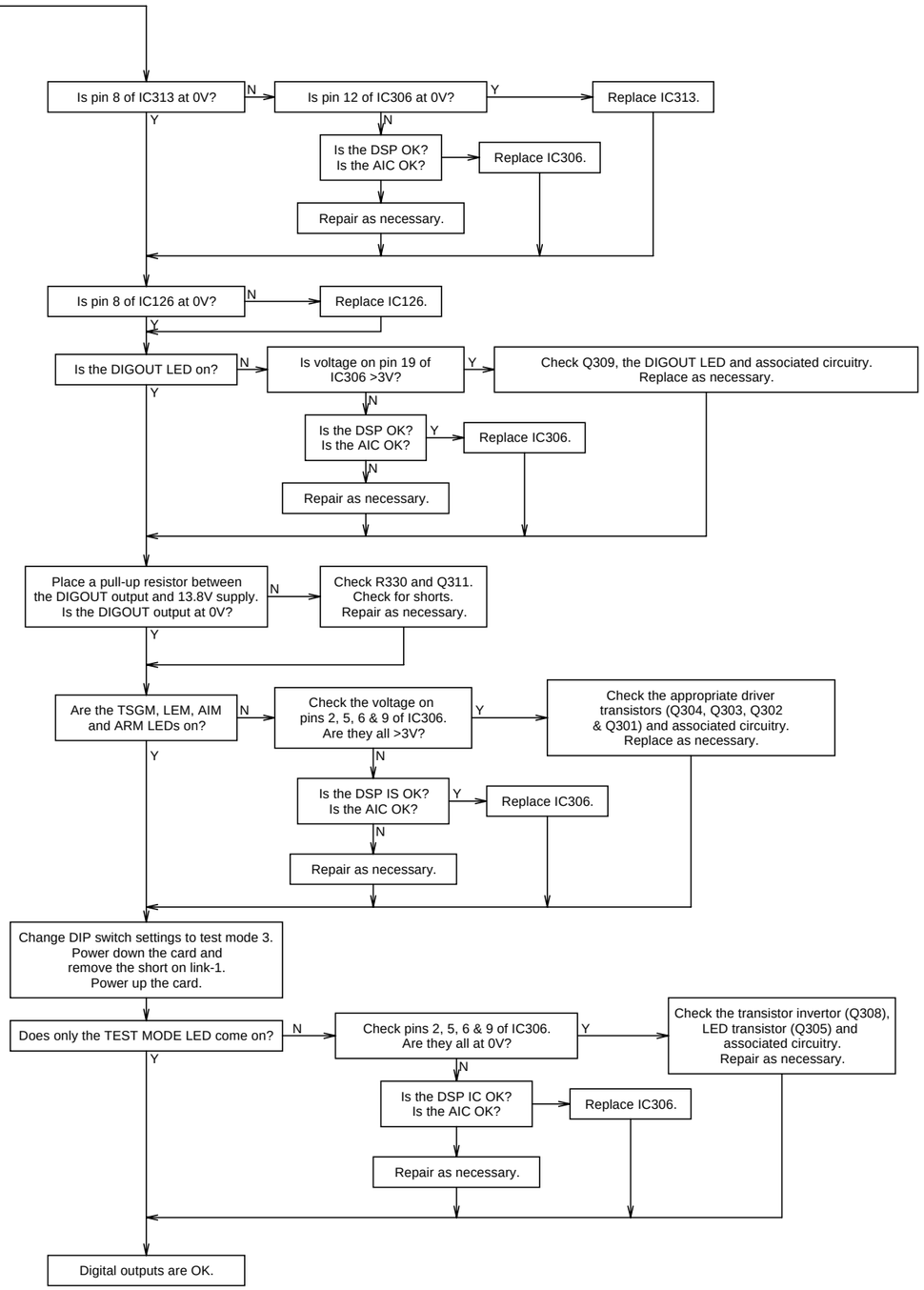
Table 8.5 DIP switch settings for testing the functionality of the DIP switches.

9.4.9 T805 Watchdog Timer



9.4.10 T805 Digital Outputs





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.

10.3 T805-04 Rack Wiring

10.3.1 Single Rack Wiring

10.3.1.1 Wiring Details

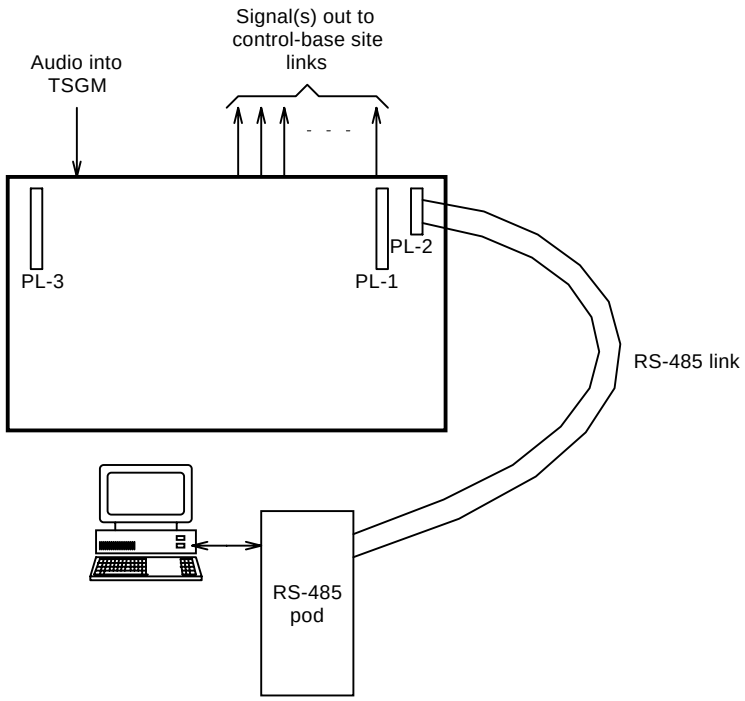


Figure 10.1 Single T805-04 Wiring Details

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).

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.

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.

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.

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

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.

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.

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.

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.

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.

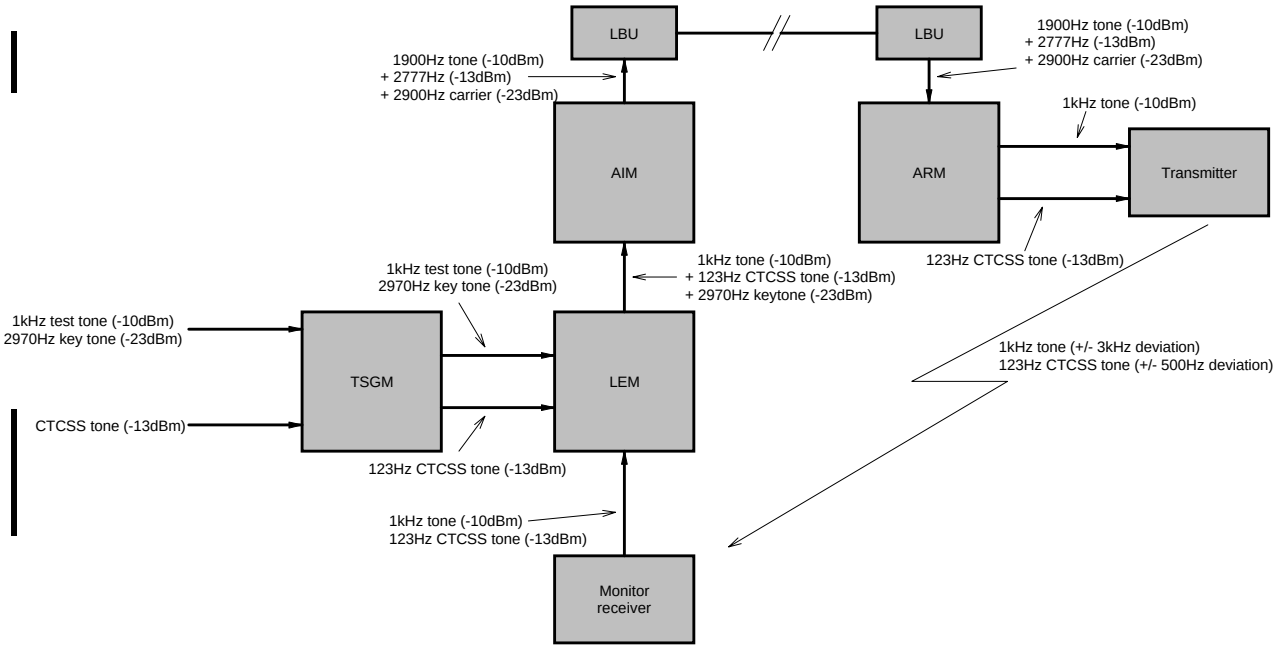


Figure 13.1 Test Levels For A TSGM/LEM/AIM/ARM/Monitor Receiver Combination

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.

Section	Title	IPN	Page
14.1	**Introduction**		**14.1.3**
14.2	**T805-02 ASP Card**	**220-01253-01**	**14.2.1**
14.3	**T805-04 Backplane PCB**	**220-01254-02**	**14.3.1**
		220-01254-04	**14.3.13**
14.4	**T805-06 Adaptor PCB**	**220-01279-00**	**14.4.1**
		220-01279-01	**14.4.9**
14.5	**T805 Front Panel PCB**	**220-01354-00**	**14.5.1**

14.2 T805-02 ASP Card

This section contains the following information.

IPN	Section	Page
220-01253-01	Parts List	14.2.2
	Mechanical & Miscellaneous Parts	14.2.5
	Grid Reference Index	14.2.7
	PCB Layout - Bottom Side	14.2.11
	PCB Layout - Top Side	14.2.12
	Processor, Memory & Regulators Circuit Diagram	14.2.13
	Analogue I/O & Conversion Circuit Diagram	14.2.14
	Serial Comms & Digital I/O Circuit Diagram	14.2.15

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

14.3 T805-04 Backplane PCB

This section contains the following information.

IPN	Section	Page
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	Grid Reference Index	14.3.7
	PCB Layout - Bottom Side	14.3.9
	PCB Layout - Top Side	14.3.10
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	Mechanical & Miscellaneous Parts	14.3.16
	Grid Reference Index	14.3.17
	PCB Layout - Bottom Side	14.3.19
	PCB Layout - Top Side	14.3.20
	Circuit Diagram - Sheet 1	14.3.21
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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

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

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

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

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.

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

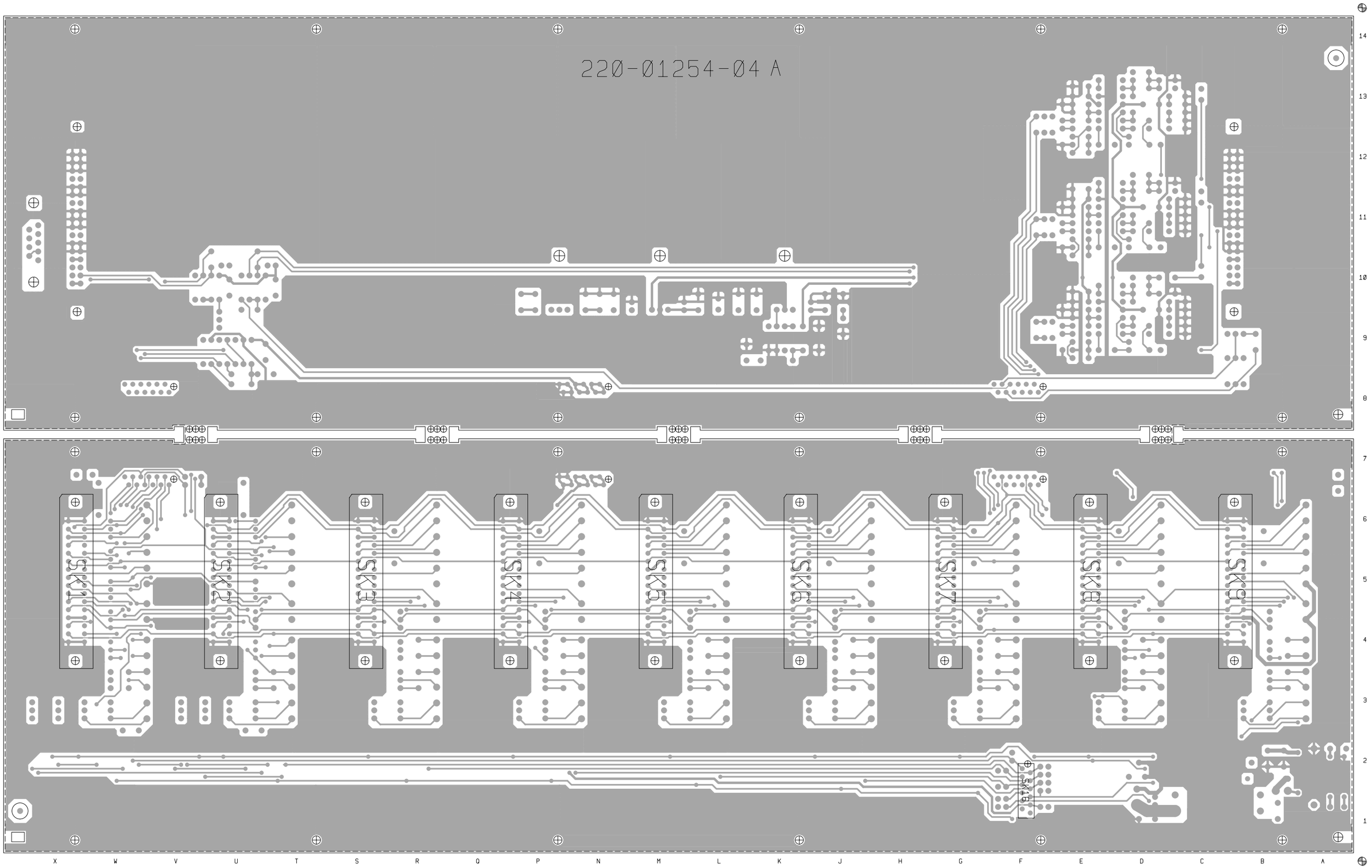
How To Use This Grid Reference Index

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.

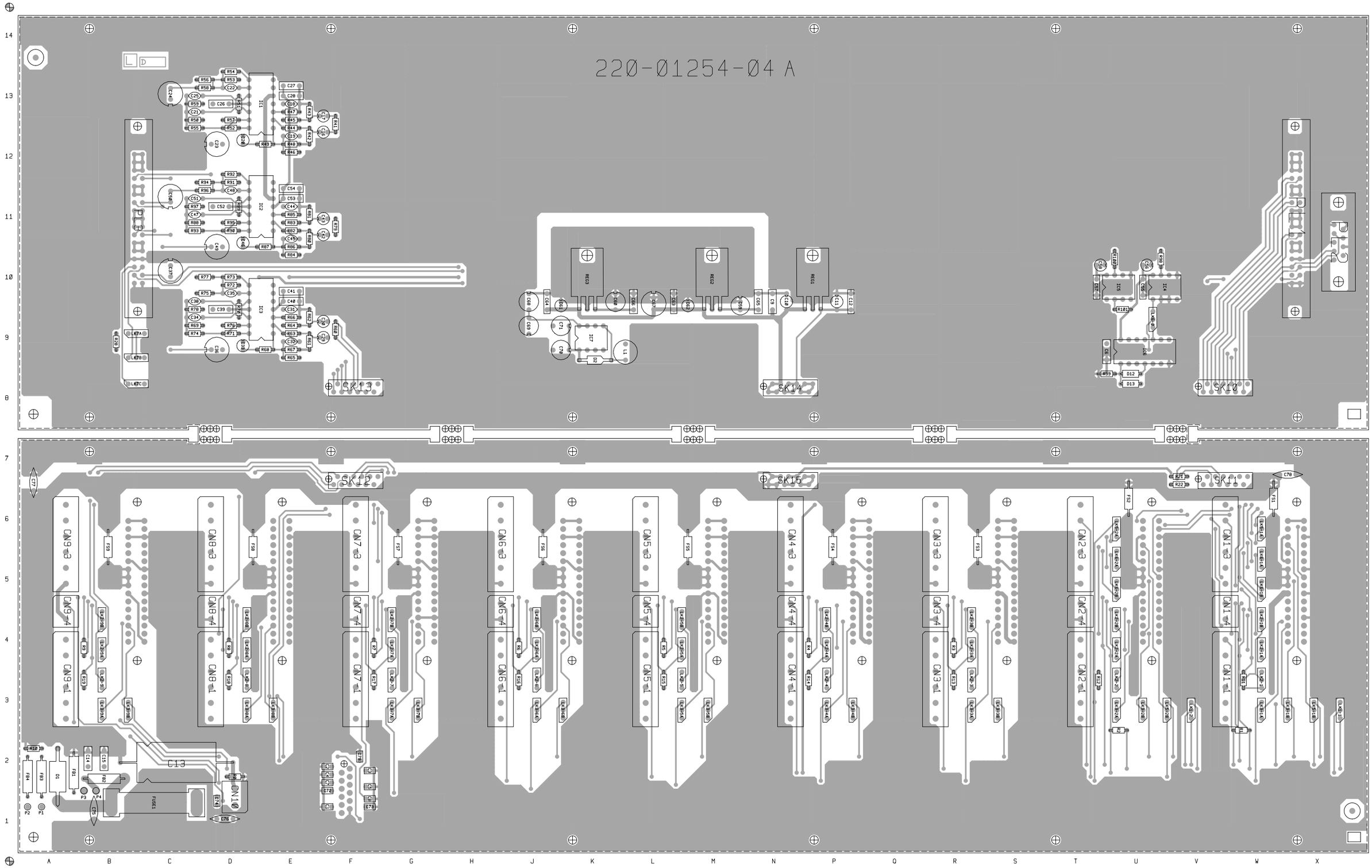
The first digit in the circuit diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

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

Device	PCB	Circuit
LK5-1A	1:W6	1-D5
LK5-1B	1:X3	1-D4
LK5-2A	1:U6	1-F5
LK5-2B	1:V3	1-F4
LK6-0	1:U9	2-C3
LK6-1A	1:W5	1-D4
LK6-1B	1:W5	1-D3
LK6-2A	1:U5	1-F4
LK6-2B	1:U5	1-F3
LK7A	1:B9	2-U9
LK7B	1:B9	2-U9
LK7C	1:B8	2-V9
P1	1:A1	2-U8
P2	1:A1	2-U7
P3	1:B1	2-V8
P4	1:B1	2-V8
PL1	1:X12	1-B5
		1-B6
		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
R21	1:V7	1-E3
R22	1:V7	1-G3
R28	1:B9	2-U9
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
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
		2-O8
		2-O9
SK8	2:E6	1-R0
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



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



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

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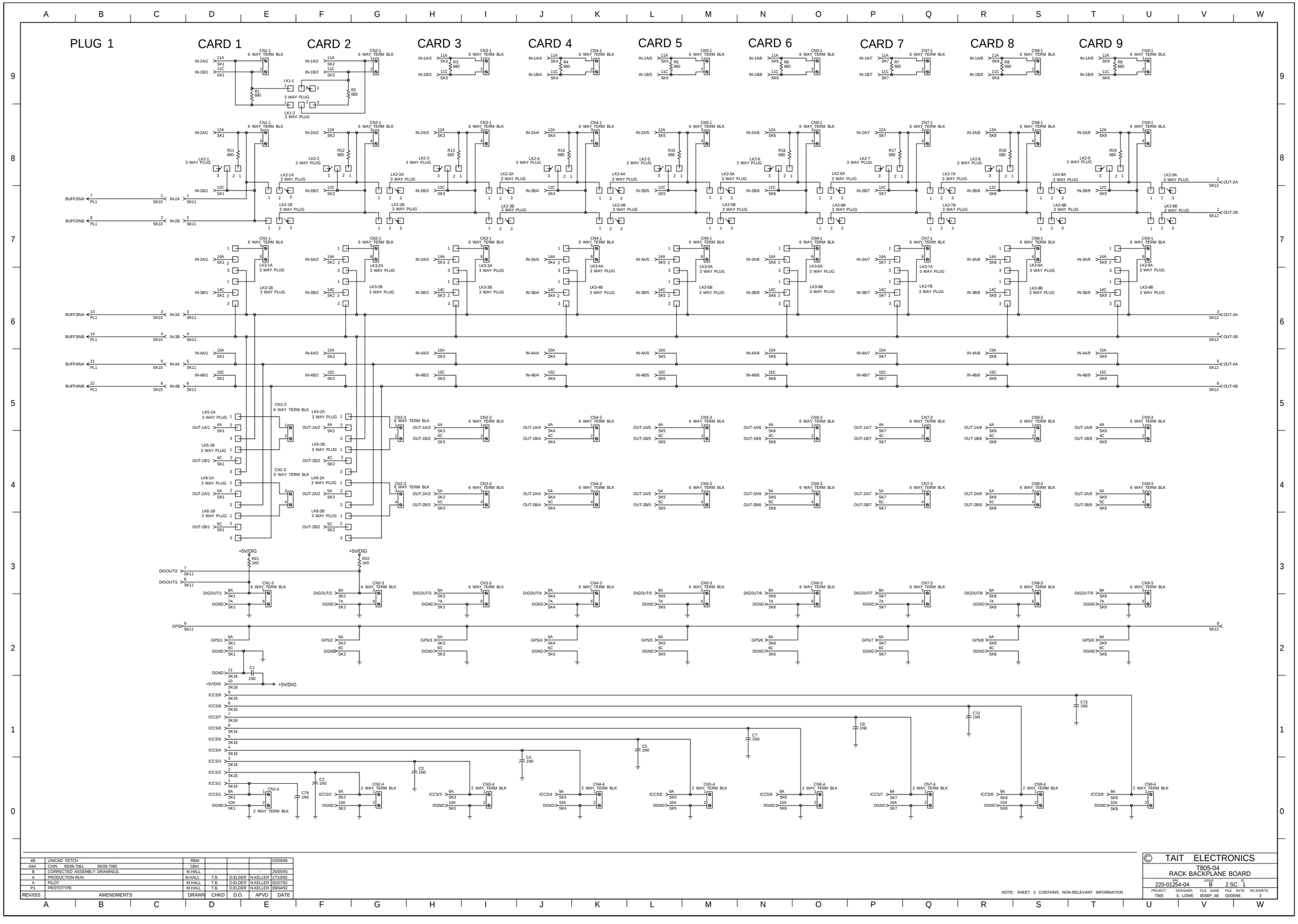

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
4B	UNICAD FETCH	RBM				03/09/96
-04A	CH/N 95/09-7061 95/09-7080	DBH	-	-	-	25/05/93
B	CORRECTED ASSEMBLY DRAWINGS.	M.HALL	-	-	-	25/05/93
A	PRODUCTION-RUN.	M.HALL	T.B.	D.ELDER	N.KELLER	27/10/92
A	PILOT	M.HALL	T.B.	D.ELDER	N.KELLER	02/07/92
P1	PROTOTYPE	M.HALL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

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

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

PL1 2X17 WAY TOP ENTRY PLUG
PL3 2X17 WAY TOP ENTRY PLUG
PL2 9 WAY TOP ENTRY DRANGE SKT
SK16 2X6 WAY TOP ENTRY SKT
SK1 2X16 WAY TOP ENTRY SKT
SK2 2X16 WAY TOP ENTRY SKT
SK3 2X16 WAY TOP ENTRY SKT
SK4 2X16 WAY TOP ENTRY SKT
SK5 2X16 WAY TOP ENTRY SKT
SK6 2X16 WAY TOP ENTRY SKT
SK7 2X16 WAY TOP ENTRY SKT
SK8 2X16 WAY TOP ENTRY SKT
SK9 2X16 WAY TOP ENTRY SKT
SK10 2X6 WAY TOP ENTRY SKT
SK11 2X6 WAY TOP ENTRY SKT
SK12 2X6 WAY TOP ENTRY SKT
SK13 2X6 WAY TOP ENTRY SKT
SK14 2X6 WAY TOP ENTRY SKT
SK15 2X6 WAY TOP ENTRY SKT

SUPPLY

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
4B	UNICAD FETCH	RBM				03/09/96
-04A	CH/N 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

T805-04
RACK BACKPLANE BOARD

DRG. 220-01254-04 ISSUE B SC. 2

PROJECT: T805 DESIGNER: S. LOWE FILE NAME: 805BP .4B FILE DATE: 03/09/96 NO.SHEETS: 3

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

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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

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

14.5 T805 Front Panel PCB

This section contains the following information.

IPN	Section	Page
220-01354-00	Parts List	14.5.2
	Circuit Diagram	14.5.4
	PCB Layout - Top Side	14.5.5
	PCB Layout - Bottom Side	14.5.6

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.

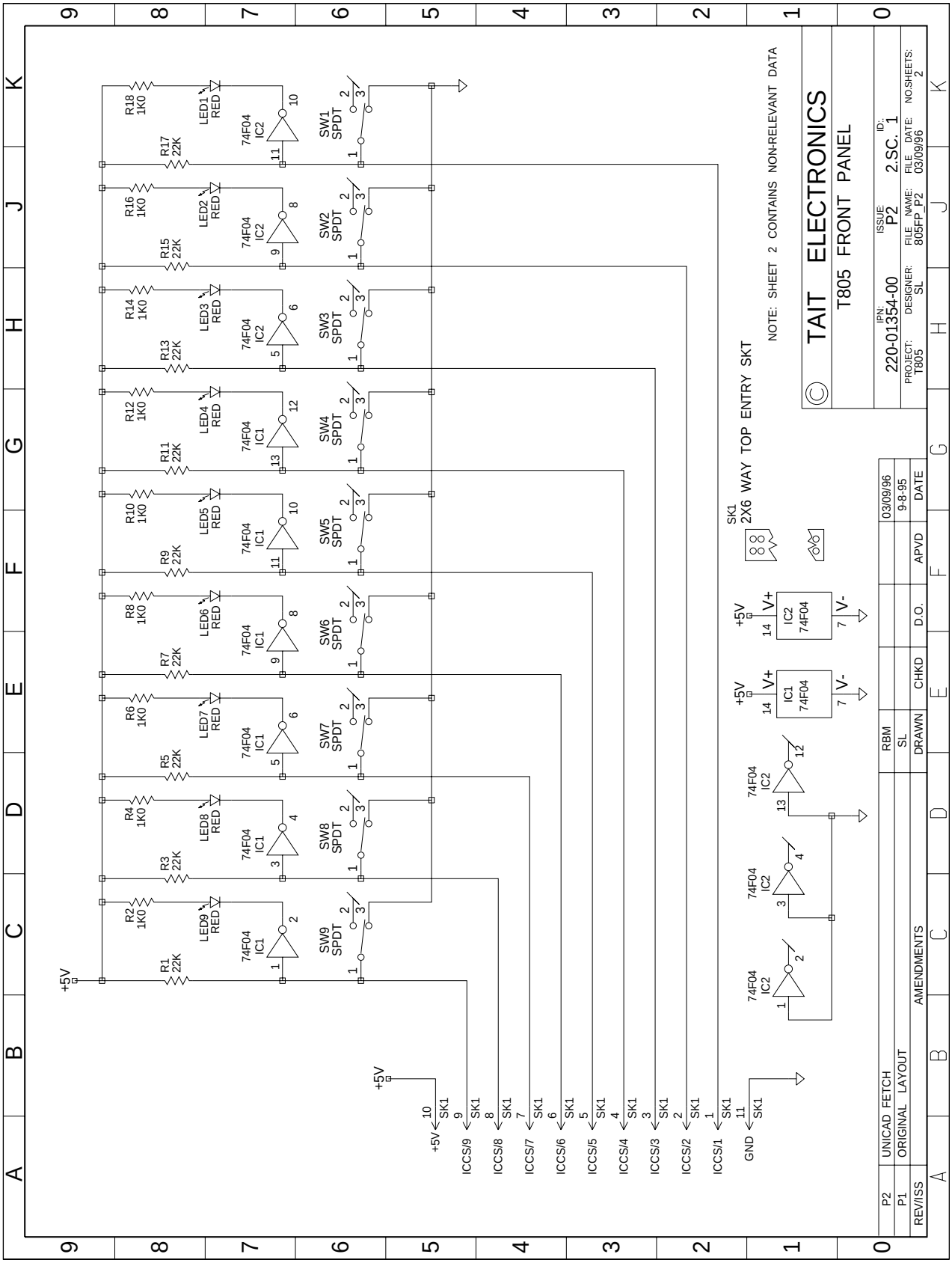
The miscellaneous and mechanical section lists the variant and common parts in IPN order.

Parts List Amendments

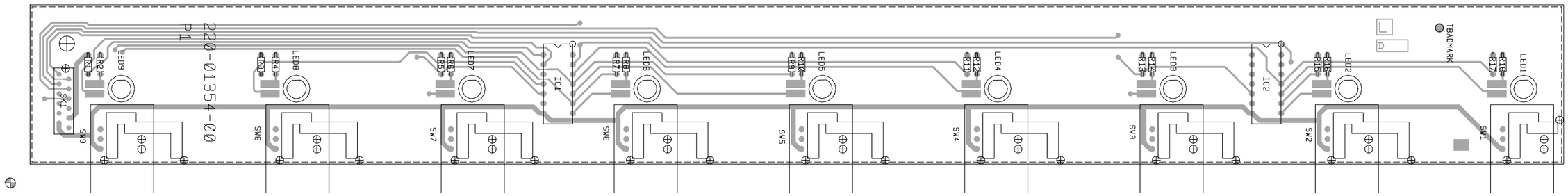
There were no amendments to the parts list at the time of publication.

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

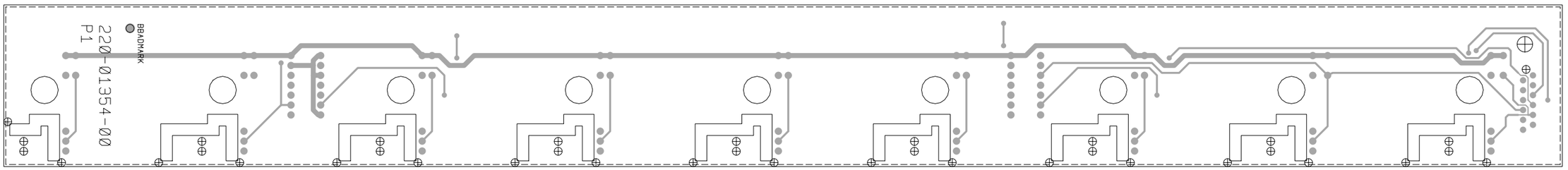
Ref	Var	IPN	Description



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



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.

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.

