RACAL INSTRUMENTS™

1260-22

HIGH POWER SWITCH

Publication No. 980673-055 Rev. A

Astronics Test Systems Inc.
4 Goodyear, Irvine, CA 92618
Tel: (800) 722-2528, (949) 859-8999; Fax: (949) 859-7139

atsinfo@astronics.com atssales@astronics.com
atshelpdesk@astronics.com http://www.astronicstestsystems.com

THANK YOU FOR PURCHASING THIS ASTRONICS TEST SYSTEMS PRODUCT

For this product, or any other Astronics Test Systems product that incorporates software drivers, you may access our web site to verify and/or download the latest driver versions. The web address for driver downloads is:

http://www.astronicstestsystems.com/support/downloads

If you have any questions about software driver downloads or our privacy policy, please contact us at:

atsinfo@astronics.com

WARRANTY STATEMENT

All Astronics Test Systems products are designed to exacting standards and manufactured in full compliance to our AS9100 Quality Management System processes.

This warranty does not apply to defects resulting from any modification(s) of any product or part without Astronics Test Systems express written consent, or misuse of any product or part. The warranty also does not apply to fuses, software, non-rechargeable batteries, damage from battery leakage, or problems arising from normal wear, such as mechanical relay life, or failure to follow instructions.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular use. The remedies provided herein are buyer's sole and exclusive remedies.

For the specific terms of your standard warranty, contact Customer Support. Please have the following information available to facilitate service.

1. Product serial number
2. Product model number
3. Your company and contact information

You may contact Customer Support by:

E-Mail:	atshelpdesk@astronics.com	
Telephone:	+1 800 722 3262	(USA)
Fax:	+1 949 859 7139	(USA)

RETURN OF PRODUCT

Authorization is required from Astronics Test Systems before you send us your product or sub-assembly for service or calibration. Call or contact Customer Support at 1-800-722-3262 or 1-949-859-8999 or via fax at 1-949-859-7139. We can also be reached at: atshelpdesk@astronics.com.

If the original packing material is unavailable, ship the product or sub-assembly in an ESD shielding bag and use appropriate packing materials to surround and protect the product.

PROPRIETARY NOTICE

This document and the technical data herein disclosed, are proprietary to Astronics Test Systems, and shall not, without express written permission of Astronics Test Systems, be used in whole or in part to solicit quotations from a competitive source or used for manufacture by anyone other than Astronics Test Systems. The information herein has been developed at private expense, and may only be used for operation and maintenance reference purposes or for purposes of engineering evaluation and incorporation into technical specifications and other documents which specify procurement of products from Astronics Test Systems.

TRADEMARKS AND SERVICE MARKS

All trademarks and service marks used in this document are the property of their respective owners.

- Racal Instruments, Talon Instruments, Trig-Tek, ActivATE, Adapt-A-Switch, N-GEN, and PAWS are trademarks of Astronics Test Systems in the United States.

DISCLAIMER

Buyer acknowledges and agrees that it is responsible for the operation of the goods purchased and should ensure that they are used properly and in accordance with this document and any other instructions provided by Seller. Astronics Test Systems products are not specifically designed, manufactured or intended to be used as parts, assemblies or components in planning, construction, maintenance or operation of a nuclear facility, or in life support or safety critical applications in which the failure of the Astronics Test Systems product could create a situation where personal injury or death could occur. Should Buyer purchase Astronics Test Systems product for such unintended application, Buyer shall indemnify and hold Astronics Test Systems, its officers, employees, subsidiaries, affiliates and distributors harmless against all claims arising out of a claim for personal injury or death associated with such unintended use.

FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.

Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.

Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid “live” circuit points.

Before operating this instrument:

1. Ensure the proper fuse is in place for the power source to operate.

2. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until performance is checked by qualified personnel.

EC Declaration of Conformity

We

Astronics Test Systems
4 Goodyear
Irvine, CA 92618

declare under sole responsibility that the

1260-22 Power Switch Module, P/N 407630
and 1260-22A Power Switch Module, P/N 407630-001

conform to the following Product Specifications:

Safety: EN 61010-1

EMC: EN50081-1
CISPR 11:1990/EN 55011 (1991): Group 1 Class A
IEC 801-2:1991/EN 50082-1 (1992): 4 kV CD, 8 kV AD
IEC 801-3:1984/EN 50082-1 (1992): 3 V/m, 27-500 MHz
IEC 801-4:1988/EN 50082-1 (1992): 1 kV

Supplementary Information:

The above specifications are met when the product is installed in an Astronics Test Systems certified mainframe with faceplates installed over all unused slots, as applicable.

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

Irvine, CA, November 12, 1998

Quality Manager

This page was left intentionally blank.

Table of Contents

List of Figures

List of Tables

This page was left intentionally blank.

DOCUMENT CHANGE HISTORY

Revision	Date	Description of Change
A	7/22/08	Revised per EO 29252 Revised format to current standards. Company name revised throughout manual. Manual now revision letter controlled. Added Document Change History Page v.
No change	03/17/09	Back of cover sheet. Revised Warranty Statement, Return of Product, Proprietary Notice and Disclaimer to current standards. Removed Reshipment Instructions in (Chap. 2-1) and removed (Chap 5). Information. now appears in first 2 sheets behind cover sheet. Updated table of contents to reflect changes made. . Added to footer: company name to lower corner opposite of Page no's i thru vi.

This page was left intentionally blank.

Chapter 1
MODULE SPECIFICATION

Introduction

The 1260-22 is a High Power VXI Switch Module developed for the 1260 Series of switch modules.

The 1260-22 is available configured from the factory and can be ordered with the Option-01T Message Based Interface.

The following features are included in the 1260-22

- 40 Channels of SPST High Power Switching.
- Message Based Interface Option available.
- New Data Driven Model embedded firmware.
- Provisions for internal wiring allows reconfiguring the 40 SPST switches to multiple multiplexers.
- Provisions for external momentary “Emergency Reset” switch to disable all relay drivers and open all channels.
- Provisions for adding shunt contact protection elements.

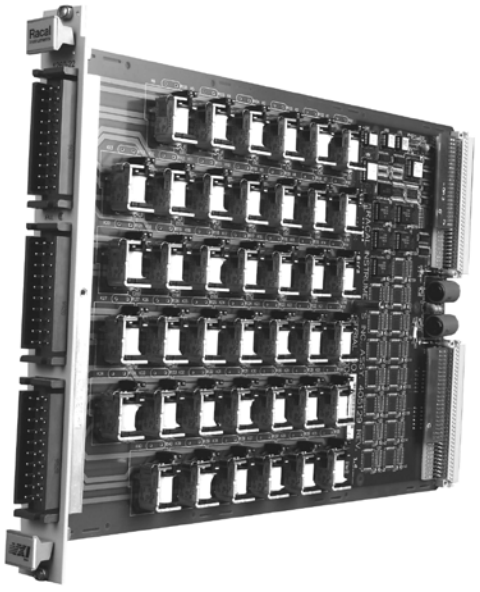


Figure 1-1, The 1260-22

Specifications

Maximum Switching voltage	
AC	250 Volts
DC	250 Volts
Maximum Switching current	
AC	20 Amperes
DC	20 Amperes
Maximum Switching power	
AC	4800 VA
DC	600 Watts
Minimum Switching power	
AC	1 Amp at 12VAC
DC	1 Amp at 5VDC
Path resistance	< 100 mOhm 20 mOhm typical @ 20Amps
Insertion Loss (50Ω)	
10 KHz	< 0.02 dB
100 KHz	< 0.1 dB
Bandwidth (50Ω)	>300kHz
Isolation (50Ω)	
10KHz	> 50 dB
100 KHz	> 30 dB
Crosstalk (50Ω)	
10 KHz	< -70 dB
100 KHz	< -50 dB
Capacitance	
Open Channel	< 250 pF
Channel / Chassis	< 250 pF
Insulation resistance	$> 10^9$ Ω
Switching Time	< 15 ms
Shock	10g, 11 msec, ½ sine wave
Vibration	0.013” PK-PK, 5-55 Hz
Bench Handling	4 in, 45°
Temperature	

Operating	0 to +55 degrees Centigrade
Non-operating	-40 to +75 degrees Centigrade
Relative Humidity	85 +/- 5% non-condensing @ < 35 degrees Centigrade
Altitude	
Operating	10,000 feet
Non-operating	15,000 feet
Power requirements	5 VDC at 1.6 Amps W/Option 01T 5 VDC at 0.6 Amps WO/Option 01T 24 VDC at 36 mA per energized relay (1.5A max)
Cooling Requirements	5.4liter/sec @ .5mmH_2O at 65 Watts (See Power and Cooling Considerations in Chapter 3)
Dimensions	C-Size, Single Slot VXIbus Module
Module Weight	
w/ OPT 01T	4 Lbs 8 oz
w/o OPT 01T	4 Lbs 3 oz
MTFB	400,255 Hrs. (See MTFB Sheet page 1-4 & 1-5)

Ordering Information

Listed below are part numbers for both the 1260-22 switch module and available mating connector accessories. Each switch card uses 3, 30 Pin mating connectors.

ITEM	DESCRIPTION	PART #
1260-22 Switch Module	1260-22, 40 Channel Hi Current	407630
1260-22A Switch Module	1260-22A, 5 4X1, 10 2X1	407630-001
1260-22 Shipping Kit	Mating Conns, Manual, Key Locks	407625
Conn., 30 Pin Cable	30 Pin mating Cable Connector	602345
Contact, 12 AWG	12 AWG Connector Contact	602346
Additional Manual	1260-22 User Manual	980673-055

Safety

Refer to the **"FOR YOUR SAFETY"** page preceding the Table of Contents. Follow all **NOTES, CAUTIONS,** and **WARNINGS** to ensure personnel safety and prevent damage to the instrument.

About MTBF

The 1260-22 MTBF is 400,255 hours, calculated in accordance with MIL-HDBK-217E, with the exception of the electromechanical relays. Relays are excluded from this calculation because relay life is strongly dependent upon operating conditions. Factors affecting relay life expectancy are:

1. Switched voltage
2. Switched current
3. Switched power
4. Maximum switching capacity
5. Maximum rated carrying current
6. Load type (resistive, inductive, capacitive)
7. Switching repetition rate
8. Ambient temperature

The most important factor is the maximum switching capacity, which is an interrelationship of maximum switching power, maximum switching voltage and maximum switching current. When a relay operates at a lower percentage of its maximum switching capacity, its life expectancy is longer. The maximum switching capacity specification is based on a resistive load, and must be further de-rated for inductive and capacitive loads.

For more details about the above life expectancy factors, refer to the data sheet for the relay.

Manufacturer	P/N
Siemens	T90N1D12-24
Aromat	JT1A-DC24V

The relay used on the 1260-22 module is part no. 310269. The relay manufacturer's specifications for this relay are:

Life Expectancy

Mechanical	10^7 operations
Electrical	10^5 operations (Full Load resistive)

For additional relay specifications, refer to the relay manufacturer's data sheet.

Chapter 2
INSTALLATION INSTRUCTIONS

Unpacking and Inspection

1. Remove the 1260-22 module and inspect it for damage. If any damage is apparent, inform the carrier immediately. Retain shipping carton and packing material for the carrier's inspection.

2. Verify that the pieces in the package you received contain the correct 1260-22 module option and the 1260-22 Users Manual. Notify Customer Service if the module appears damaged in any way. Do not attempt to install a damaged module into a VXI chassis.

3. The 1260-22 module is shipped in an anti-static bag to prevent electrostatic damage to the module. Do not remove the module from the anti-static bag unless it is in a static-controlled area.

Option 01T Installation

Installation of the Option 01T is described in the Installation and Setup section of the 1260A-Option 01T Users Manual, Publication No. 980806-999.

Module Installation

Installation of the 1260-22 Switching Module into a VXI mainframe, including the setting of switches SW1-1 through SW1-4, SW2, and SW3, is described in the Installation and Setup Section of the 1260A Option 01T Users Manual, Publication No. 980806-999.

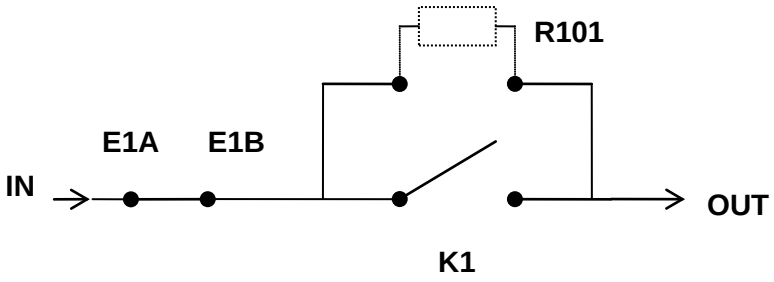
Module Configuration

The 1260-22 is a 40-channel single wire module consisting of 40 individual SPST relay switches. Refer to **Figure 2-2** for a block diagram of the 1260-22. This single relay architecture permits the 1260-22 module to be organized via software in any configuration from 40 – SPST's to 1 - 40PST or any combination thereof (by use of the include command) without the use of hardware jumpers. This is the same as being automatically configurable as a 1-wire, 2-wire, … n-wire switch.

In addition, by using internal jumpers, the user can configure the module as a SP2T, SP3T, etc., up to a SP40T switch (i.e. a multiplexer).

The 1260-22A is a standard configuration of the 1260-22 which uses internal jumpers to configure the module as 5 - 4x1 multiplexers and 10 - 2x1 multiplexers. Refer to **Figure 2-3** for a block diagram of the 1260-22A.

Provision is made on the PCB to add contact protection devices such as MOV's or snubbers to each of the relay channels if the relay contact load is inductive. Some suggested devices include a Phillips Components P/N 2322-594 Series of varistors. Refer to **Figure 2-1,** for a 1260-22 typical Module Relay Channel.



One Channel of Forty is shown, with provisions for the addition of shunt elements and internal jumpers at E-points

Figure 2-1, Typical 1260-22 Relay Channel

Front Panel Connectors

The 1260-22 front panel connectors are labeled J200, J201 and J202. The connector type is a High Power connector, using 30, 0.062-inch diameter pins, one for each input or output. **Figure 2-4** shows the pin numbering. The mapping of channel numbers to connector pins for the 1260-22 and the 1260-22A is given in **Table 2-1** and **Table 2-2**.

	IN		OUT
CH00	**J200-11**		**J200-1**
CH01	**J200-22**		**J200-21**
CH02	**J200-2**		**J200-12**
CH03	**J200-13**		**J200-3**
CH04	**J200-24**		**J200-23**
CH05	**J200-4**		**J200-14**
CH06	**J200-15**		**J200-5**
CH07	**J200-26**		**J200-25**
CH08	**J200-6**		**J200-16**
CH09	**J200-17**		**J200-7**
CH10	**J200-28**		**J200-27**
CH11	**J200-8**		**J200-18**
CH12	**J200-19**		**J200-9**
CH13	**J200-30**		**J200-29**
CH14	**J200-10**		**J200-20**
CH15	**J201-11**		**J201-1**
CH16	**J201-22**		**J201-21**
CH17	**J201-2**		**J201-12**
CH18	**J201-13**		**J201-3**
CH19	**J201-24**		**J201-23**

	IN		OUT
CH20	**J201-4**		**J201-14**
CH21	**J201-17**		**J201-7**
CH22	**J201-28**		**J201-27**
CH23	**J201-8**		**J201-18**
CH24	**J201-19**		**J201-9**
CH25	**J201-30**		**J201-29**
CH26	**J201-10**		**J201-20**
CH27	**J202-11**		**J202-1**
CH28	**J202-22**		**J202-21**
CH29	**J202-2**		**J202-12**
CH30	**J202-13**		**J202-3**
CH31	**J202-24**		**J202-23**
CH32	**J202-4**		**J202-14**
CH33	**J202-15**		**J202-5**
CH34	**J202-26**		**J202-25**
CH35	**J202-6**		**J202-16**
CH36	**J202-17**		**J202-7**
CH37	**J202-28**		**J202-27**
CH38	**J202-8**		**J202-18**
CH39	**J202-19**		**J202-9**

Figure 2-2, 1260-22 Block Diagram

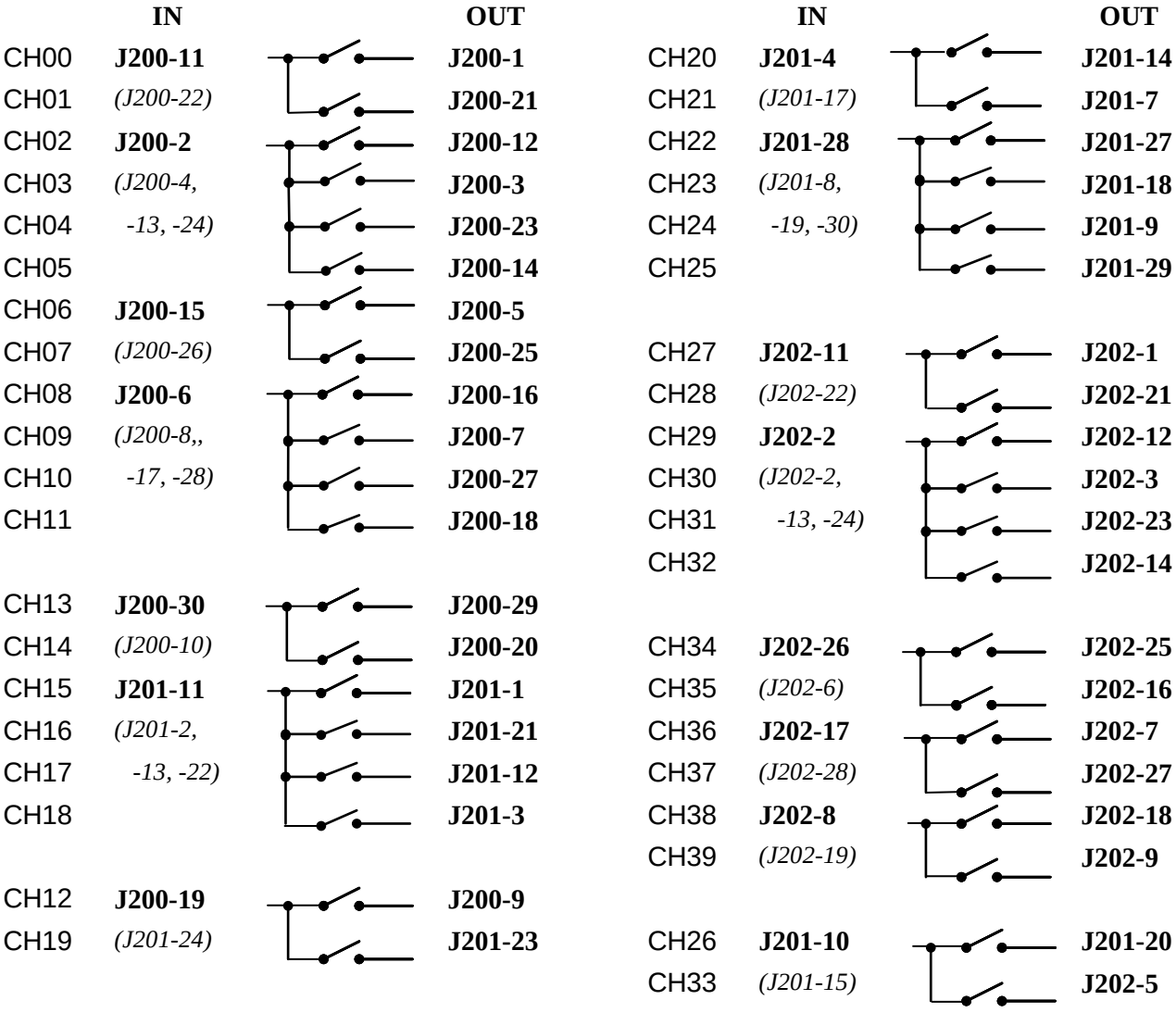


Figure 2-3, 1260-22A Block Diagram

NOTE:

Pins shown in parentheses are for reference only.

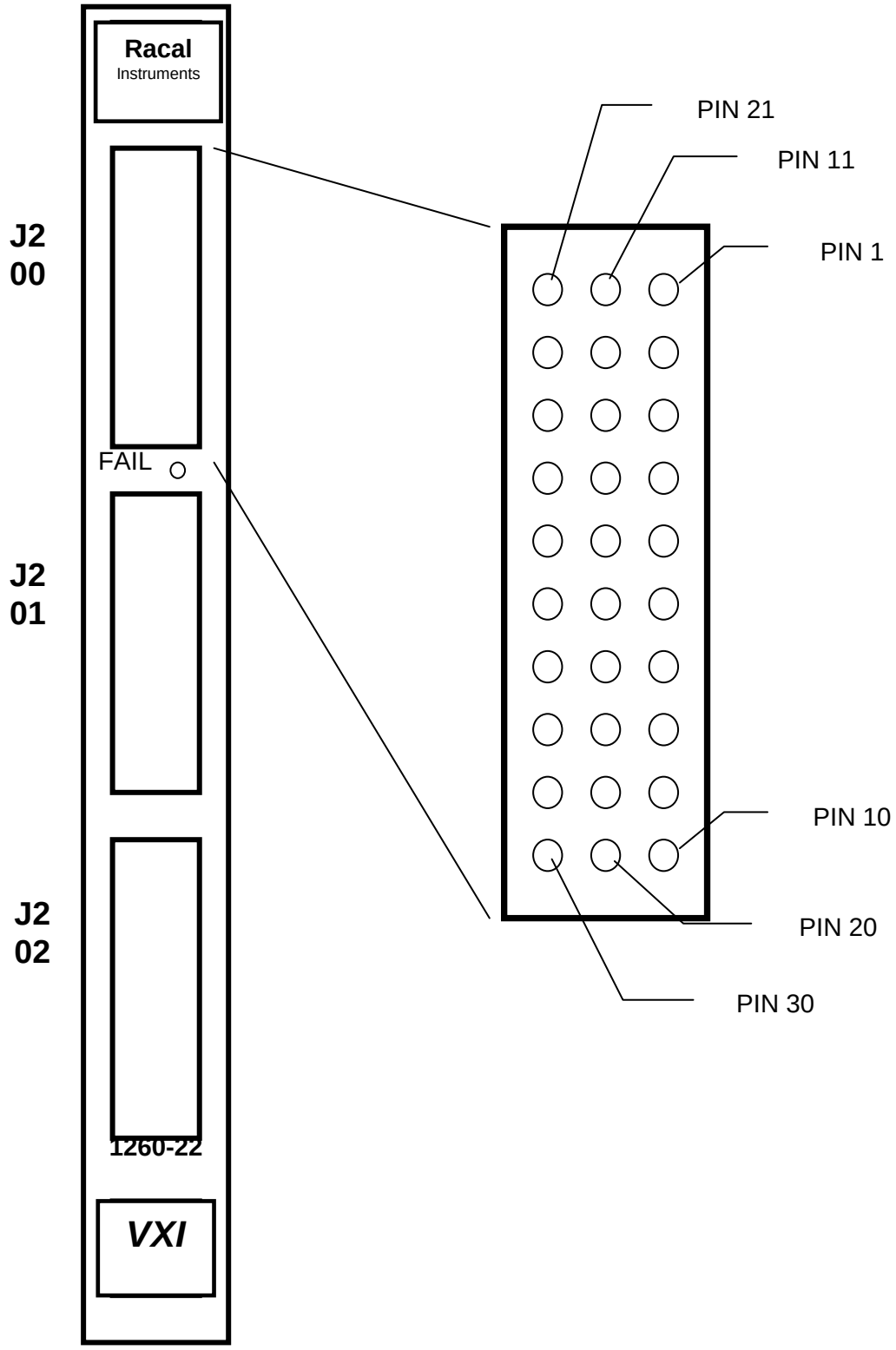


Figure 2-4, 1260-22 Front Panel Pin Connections, Front View

Mating Connectors

Mating connectors are provided for the 1260-22 module. Astronics Test Systems also offers the following accessories and spare connectors (see ordering information for part numbers):

-30 Pin Connector Housing with backshell P/N 602345

-12 AWG Solder Contacts P/N 602346

The 30 Pin Connector consists of a connector housing and backshell, The contacts are solder type and can except any gauge wire up to 12 AWG. After wire attachment, the pin is inserted in the housing and will snap into place, providing a positive retention. To be sure the pin is locked in place, the assembler should tug on the wire after insertion.

The suggested contact insertion tool for the pins is a Positronic Industries P/N 9099. The corresponding contact extraction tool is a Positronic Industries P/N 9081.

Refer to **Table 2-1** and **Table 2-2** for the mapping of channels to connector.

Table 2-1, 1260-22 Channel to Connector Pin Mapping

Relay	Channel Descriptor	Connector In	Connector Out
K1	00	J200-11	J200-1
K2	01	J200-22	J200-21
K6	02	J200-2	J200-12
K5	03	J200-13	J200-3
K4	04	J200-24	J200-23
K3	05	J200-4	J200-14
K7	06	J200-15	J200-5
K8	07	J200-26	J200-25
K12	08	J200-6	J200-16
K13	09	J200-17	J200-7
K11	10	J200-28	J200-27
K10	11	J200-8	J200-18
K9	12	J200-19	J200-9
K14	13	J200-30	J200-29
K15	14	J200-10	J200-20
K19	15	J201-11	J201-1
K20	16	J201-22	J201-21
K18	17	J201-2	J201-12
K17	18	J201-13	J201-3
K16	19	J201-24	J201-23
K21	20	J201-4	J201-14
K22	21	J201-17	J201-7
K26	22	J201-28	J201-27
K27	23	J201-8	J201-18
K25	24	J201-19	J201-9
K24	25	J201-30	J201-29
K23	26	J201-10	J201-20
K28	27	J202-11	J202-1
K29	28	J202-22	J202-21
K33	29	J202-2	J202-12
K34	30	J202-13	J202-3
K32	31	J202-24	J202-23
K31	32	J202-4	J202-14
K30	33	J202-15	J202-5
K35	34	J202-26	J202-25
K36	35	J202-6	J202-16
K40	36	J202-17	J202-7
K39	37	J202-28	J202-27
K38	38	J202-8	J202-18
K37	39	J202-19	J202-9

Notes: 1. Chassis Ground Connections are provided on Connector J201 as follows:

J201-5 J201-6 J201-15
J201-16 J201-25 J201-26

2. External emergency reset is provided on J202-29 and the return on J202-30.

Table 2-2, 1260-22A Channel to Connector Pin Mapping

Relay	Channel Descriptor	Connector In	Connector Out
K1	00	J200-11 *(J200-22)*	J200-1
K2	01		J200-21
K6	02	J200-2 *(J200-4,-13, -24)*	J200-12
K5	03		J200-3
K4	04		J200-23
K3	05		J200-14
K7	06	J200-15 *(J200-26)*	J200-5
K8	07		J200-25
K12	08	J200-6 *(J200-8, -17, -28)*	J200-16
K13	09		J200-7
K11	10		J200-27
K10	11		J200-18
K14	13	J200-30 *(J200-10)*	J200-29
K15	14		J200-20
K19	15	J201-11 *(J201-2, -13, -22)*	J201-1
K20	16		J201-21
K18	17		J201-12
K17	18		J201-3
K21	20	J201-4 *(J201-17)*	J201-14
K22	21		J201-7
K26	22	J201-28 *(J201-8, –19, -30)*	J201-27
K27	23		J201-18
K25	24		J201-9
K24	25		J201-29
K28	27	J202-11 *(J202-22)*	J202-1
K29	28		J202-21
K33	29	J202-2 *(J202-2, -13, -24)*	J202-12
K34	30		J202-3
K32	31		J202-23
K31	32		J202-14
K35	34	J202-26 *(J202-6)*	J202-25
K36	35		J202-16

Table 2-2, 1260-22A Channel to Connector Pin Mapping (continued)

Relay	Channel Descriptor	Connector In	Connector Out
K40	36	J202-17	J202-7
K39	37	*(J202-28)*	J202-27
K38	38	J202-8	J202-18
K37	39	*(J202-19)*	J202-9
K9	12	J200-19	J200-9
K16	19	*(J201-24)*	J201-23
K23	26	J201-10	J201-20
K30	33	*(J201-15)*	J202-5

Notes: 1. Chassis Ground Connections are provided on Connector J201 as follows:

J201-5 J201-6 J201-15

J201-16 J201-25 J201-26

2. External emergency reset is provided on J202-29 and the return on J202-30.
3. The pins shown in parentheses are for reference only.

This page was left intentionally blank.

Chapter 3
MODULE OPERATION

General Information

The 1260-22 may be operated either in *message-based mode* or in *register-based mode*.

When the *message-based mode* of operation is used, commands are sent to the 1260-01T command module. The 1260-01T command module interprets the commands, and operates the 1260-22 module by sending 8-bit bytes to control registers on the 1260-22 module.

A conceptual view of the message-based mode of operation is shown in **Figure 3-1** below.

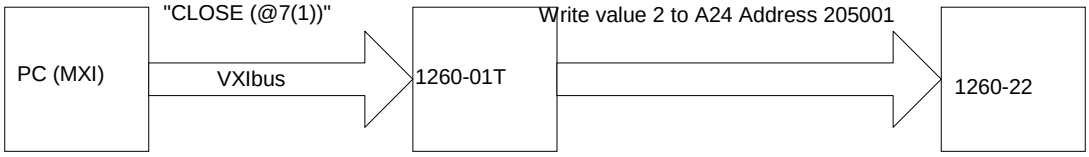


Figure 3-1, Message-Based Mode of Operation

When the *register-based mode* of operation is used, the user writes to the control register on the 1260-22 module directly. The 1260-01T command module does not monitor the operations, and does not track the state of the relays on the module in this mode.

A conceptual view of the register-based mode of operation is shown in **Figure 3-2** below.

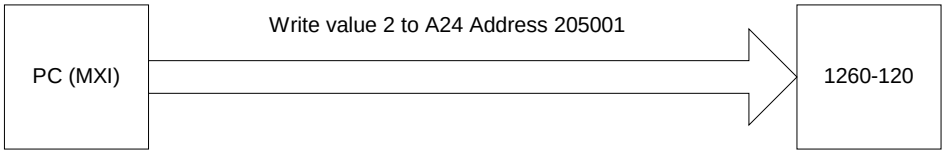


Figure 3-2, Register-Based Mode of Operation

Since the 1260-01T command module does not monitor the register-based mode of operation, it is advisable to select **either** the message-based or the register-based mode of operation, and continue to use the same mode throughout the application program.

In general, the message-based mode of operation is easier to use with utility programs, such as National Instruments VIC program. The message-based mode allows the user to send ASCII text commands to the 1260-01T and to read replies from the 1260-01T. In addition, there are a few features, such as a SCAN list, which are available only with the message-based mode of operation.

The register-based mode of operation provides a faster update of relay channels. This mode provides for relay operations in less than 4.5 microseconds (not counting software overhead inherent in I/O libraries such as VISA).

Consult the 1260-01T User's Manual for a comparison of the message-based and register-based modes of operation.

Operating The 1260-22 In Message-Based Mode

Channel Descriptors For The 1260-22 Module

The standard 1260-01T commands are used to operate the 1260-22 module. These commands are described in the 1260-01T User's Manual.

Each 1260-01T relay command uses a *channel descriptor* to select the channel(s) of interest. The syntax for a channel descriptor is the same for all 1260 series modules. In general, the following syntax is used to select a single channel:

```
(@ <module address> ( <channel> ) )
```

Where:

<module address> is the address of the 1260-22 module, as set by the logical address DIP switch SW1 on the 1260-22.

The module address is a number from 1 through 12, inclusive.

Set the module addresses for the 1260-22 and other 1260-Series modules so that no address is used by more than one 1260-Series module. For instructions on setting module addresses for a 1260-Series module, see the label on the side panel of the module.

<channel> is the 1260-22 channel to operate. This will be a number in the range from 0 through 39, inclusive.

Multiple individual channels may be specified using the following channel descriptor syntax:

```
(@ <module address> ( <chan1> , <chan2> , .
. ., <chanN> ))
```

A range of channels may be specified using the following channel descriptor syntax:

```
(@ <module address> ( <first channel> :
<last channel> ))
```

The following examples illustrate the use of the channel descriptors for the 1260-22:

`OPEN (@8(0))`	Open channel 0 on the 1260-22 with module address 8
`CLOSE (@8(0,7))`	Close channels 0 and 7 on the 1260-22 with module address 8.
`CLOSE (@2(7:12))`	Close channels 7 through 12 inclusive on the 1260-22 with module address 2

Reply To The MOD:LIST? Command

The 1260-01T returns a reply to the MOD:LIST? command. This reply is unique for each different 1260 series switch module. The syntax for the reply is:

<module address> : <module-specific identification string>

The <module-specific identification string> for the 1260-22 is:

1260-22 40-CHANNEL SPST 20A SWITCH MODULE

So, for a 1260-22 whose <module address> is set to 8, the reply to this query would be:

8 : 1260-22 40-CHANNEL SPST 20A SWITCH MODULE

Operating The 1260-22 in Register-Based Mode

The 1260-22 may be operated by directly setting one of the five control registers on the 1260-22 module. The first control register on the module operates relays K1 through K8. The second control register operates relays K9 through K16. The third control register operates relays K17 through K24, and so on up to relay K40. When a control register is updated, all relays controlled by that control register are operated in parallel.

The control registers are located in the VXIbus A24 Address Space. The actual A24 address for a control register depends on:

1. The A24 Address Offset assigned to the 1260-01T module by the Resource Manager program. The Resource Manager program is provided by the VXIbus slot-0 controller vendor. The A24 Address Offset is placed into the "Offset Register" of the 1260-01T by the Resource Manager.

2. The <module address> of the 1260-22 module. This is set by the setting of the logical Address DIP switch SW1on the 1260-22 to a value between 1 and 12 inclusive.

3. The control register on the 1260-22 to update. Each control register on the 1260-22 has a unique address.

The base A24 Address for the 1260-22 module may be calculated by:

> (A24 Offset of the 1260-01T) + (1024 x Module Address of 1260-22).

The A24 Offset is usually expressed in hexadecimal. A typical value of 204000_{16} will be used in the examples which follow. So, a sample 1260-22 with a module address of 7 would have the base A24 Address computed as follows:

> Base A24 Address of 1260-22 = 204000_{16} + (400_{16} x 7_{10}) = $205C00_{16}$

The control registers for 1260 series modules are always on odd A24 addresses. The five control registers for the 1260-22 reside at the first five odd A24 addresses for the module:

> (Base A24 Address of 1260-22) + 1 = Control Register 0
>
> (Base A24 Address of 1260-22) + 3 = Control Register 1
>
> (Base A24 Address of 1260-22) + 5 = Control Register 2
>
> (Base A24 Address of 1260-22) + 7 = Control Register 3
>
> (Base A24 Address of 1260-22) + 9 = Control Register 4

So, for our example, the five control registers are located at:

205C01 Control Register 0, controls relays 1 through 8

205C03 Control Register 1, controls relays 9 through 16

205C05 Control Register 2, controls relays 17 through 24.

205C07 Control Register 3, controls relays 25 through 32.

205C09 Control Register 4, controls relays 33 through 40.

Note: The channel assignments for the 1260-22 do not directly correspond with the relays that are controlled by the control registers A list of the Control registers and the relays and channels that they control are shown below. Bit 7 is the most significant bit (MSB) and Bit 0 is the least significant bit (LSB).

Control Register 0

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
K8	K7	K6	K5	K4	K3	K2	K1
Chan 7	Chan 6	Chan 2	Chan 3	Chan 4	Chan 5	Chan 1	Chan 0

Control Register 1

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
K16	K15	K14	K13	K12	K11	K10	K9
Chan 19	Chan 14	Chan 13	Chan 9	Chan 8	Chan 10	Chan 11	Chan 12

Control Register 2

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
K24	*K23*	K22	K21	K20	K19	K18	K17
Chan 25	Chan 26	Chan 21	Chan 20	Chan 16	Chan 15	Chan 17	Chan 18

Control Register 3

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
K32	K31	K30	K29	K28	K27	K26	K25
Chan 31	Chan 32	Chan 33	Chan 28	Chan 27	Chan 23	Chan 22	Chan 24

Control Register 4

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
K40	K39	K38	K37	K36	K35	K34	K33
Chan 36	Chan 37	Chan 37	Chan 39	Chan 35	Chan 34	Chan 30	Chan 29

Relays are closed when the corresponding control bit is set to 1 and are opened when the corresponding control bit is cleared to 0. Thus, if you write the value 1000 0101 binary = 133 decimal = 85 hexadecimal to Control Register 0, relays K1, K3, and K8 will be closed, while relays K2, K4, K5, K6, and K7 will be opened.

The present control register value may be read back by reading an 8-bit value from the control register address. **The value is inverted by the 1260-22 hardware.** This means that if you want to change the state of a single relay without affecting the present state of the other relays controlled by the control register, you must:

1. Read the control register
2. Invert the bits (perform a one's complement on the register data)
3. Perform a bit-wise AND operation, leaving all but the specific control register bit for the relay to change
4. **To open**: continue to step 5. **To close**: OR in the bit for the relay to close
5. Write the modified value back to the control register.

For example, to close relay K14 (Channel 13)

1. Read Control Register 1
2. Invert the bits in the value read in step 1
3. AND with 1101 1111 binary
4. OR with 0010 0000 binary
5. Write the value to Control Register 1

The VISA I/O library may be used to control the module. The VISA function viOut8() is used to write a single 8-bit byte to a control register, while viIn8() is used to read a single 8-bit byte from the control register. The following code example shows the use of viOut8() to update the 1260-22 module.

1260-22 Example Code

```
#include <visa.h>

/* This example shows a 1260-01T at logical address 16 and a VXI/MXI */
/* interface */
#define RI1260_01_DESC  "VXI::16"

/* For a GPIB-VXI interface, and a logical address of 77 */
/* the descriptor would be:  "GPIB-VXI::77" */


/* this example shows a 1260-22 with module address 7 */
#define MOD_ADDR_22     7


void example_operate_1260_22(void)
{
      ViUInt8 creg_val;
      ViBusAddress creg0_addr;
      ViBusAddress creg1_addr;
      ViBusAddress creg2_addr;
      ViSession hdl1260;      /* VISA handle to the 1260-01T */
      ViSession hdlRM;        /* VISA handle to the resource manager */
      ViStatus error;         /* VISA error code */

      /* open the resource manager */
      /* this must be done once in application program */
      error = viOpenDefaultRM (&hdlRM);

      if (error < 0) {
            /* error handling code goes here */
      }

      /* get a handle for the 1260-01T */
      error = viOpen (hdlRM, RI1260_01_DESC, VI_NULL,VI_NULL, &hdl1260);
      if (error < 0) {
            /* error handling code goes here */
      }


      /* form the offset for control register 0 */
      /* note that the base A24 Address for the 1260-01T */
      /* is already accounted for by VISA calls viIn8() and */
      /* viOut8() */

                  /* module address shifted 10 places = module address x 1024 */

      creg0_addr = (MOD_ADDR_22 << 10) + 1;
```

```
	creg1_addr = creg0_addr + 2;
	creg2_addr = creg1_addr + 2;

	/* close relay K14 without affecting the state of */
	/* relays K9, K10, K11, K12, K13, K15 and K16*/
	error = viIn8 (hdl1260, VI_A24_SPACE, creg1_addr, &creg_val);
	if (error < 0) {
		/* error handling code goes here */
	}

	/* invert the bits to get the present control register value */
	creg_val = ~creg_val;

	/* AND to leave every relay except K14 unchanged */
	creg_val &= ~ (0x20);

	/* OR in the bit to close K14 */
	creg_val |= 0x20;

	/* write the updated control register value */
	error = viOut8 (hdl1260, VI_A24_SPACE, creg1_addr, creg_val);
	if (error < 0) {
		/* error handling code goes here */
	}

	/* open relay K17 without affecting relays K18, K19, or K20 */
	error = viIn8 (hdl1260, VI_A24_SPACE, creg2_addr, &creg_val);
	if (error < 0) {
		/* error handling code goes here */
	}

	/* invert the bits to get the present control register value */
	creg_val = ~creg_val;

	/* AND to leave every relay except K17 unchanged */
	/* leave bit 0 clear to open relay K17 */
	creg_val &= ~ (0x01);

	/* write the updated control register value */
	error = viOut8 (hdl1260, VI_A24_SPACE, creg2_addr, creg_val);
	if (error < 0) {
		/* error handling code goes here */
	}


	/* close the VISA session */
	error = viClose( hdl1260 );
	if (error < 0) {
		/* error handling code goes here */
	}
}
```

Emergency Reset Feature

To enhance safety in applications that involve power switching, the 1260-22 offers an emergency reset function, activated by an external input. This function instantly opens all relays in response to an external event. This is a hardware operation that does not require intervention on the part of the Option-01T or application software.

CAUTION:

When using the emergency reset feature, exercise due caution if any undesirable effects may result from opening all channels.

Interface

The 1260-22 reset inputs are located at pins 29 and 30 of connector J202 on the front panel. You may connect this to an external device such as a mechanical switch. When the switch is closed, all relays on the plug-in or module are immediately opened.

Normal State of External Switch

If desired, a jumper may be added to the 1260-22 to accommodate an active “open” external switch. Active “closed” is the default.

If you prefer to use an active “open” switch, add a shunt jumper to the header designated as **JP2** on the 1260-22 printed circuit board (see **Figure 3-3**).

NOTE:

The emergency reset inputs (J202 pins 29 and 30) must be inactive during initialization of the VXIbus system. If the emergency reset is configured for normally-open operation (reset occurs when reset pins are connected together), then the pins must not be connected together during system initialization. Otherwise, the slot 0 controller will not detect the presence of the Option-01T that controls the 1260-22 module.

Similarly, if the emergency reset is configured for normally-closed operation (reset occurs when reset pins are not connected together), then the reset pins must be connected together during system initialization. The reset pins must not call for a reset condition while the system is being initialized.

Scope of Reset Event

The 1260-22 design allows the scope of an emergency reset to be configured. In the default configuration, the 1260-22 opens only its own relays in response to an external reset event. If desired, a jumper setting on the 1260-22 may be changed so that the effect of an emergency reset is global. With the global reset configuration, a reset signal propagates through the VXI Local Bus to open all relays on all switch products that are connected to the same Option-01T.

The local/global jumper on the 1260-22 printed circuit board governs this option. The jumper is designated **JP1** (see **Figure 3-3**), and is a two pin shunt jumper similar to those used on disk drives and personal computer boards. When open, only the relays on the 1260-22 are opened in response to an emergency reset condition (local reset). When jumpered, all relays on all boards controlled by the same Option-01T are opened (global reset). The 1260-22 is shipped with **JP1** in the open condition (local reset).

All 1260-Series and Adapt-a-Switch plug-ins respond to an emergency reset condition when the scope is set to global. Certain plug-ins and 1260-Series modules provide the front-panel contacts for the external switch, and the circuitry to recognize a reset event. A switch system may make full use of the emergency reset feature if it includes at least one plug-in or 1260-Series module that has reset recognition capability, such as the 1260-22.

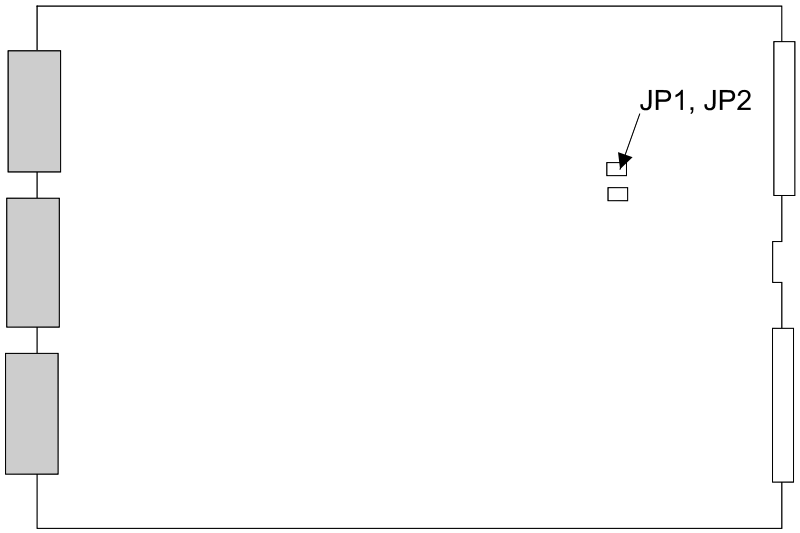


Figure 3-3, 1260-22

Sequence of Events

When a reset event occurs, the following sequence takes place:

- The 1260-22 recognizes the reset event and sets a logic latch.
- All relays are opened on the 1260-22. This occurs within the time it actually takes the contacts to open, typically fifteen milliseconds.
- If the scope of the reset function is set to global, then all relays on all switch products connected to the same Option-01T are also opened. This happens independently of software.
- An interrupt is generated to notify the Option-01T that a reset event has occurred. This informs the Option-01T that the relays have opened, so that it remains up-to-date on the relay status.
- The relays remain open and do not respond to any commands from the Option-01T.
- After the reset condition is removed (the external switch is returned to its normal position), the relays remain open until otherwise commanded by the Option-01T.

Once a reset condition has occurred, no communications can occur between the Option-01T and any switch modules until the reset condition is removed. When the reset condition is removed, the relays remain in the open state until operated under software control.

If the user issues a relay command while a reset condition is applied, then the following message shall be received:

-300 *"DEVICE-SPECIFIC ERROR: EXTERNAL RESET PREVENTS EXECUTING OF COMMAND OR OPERATION."*

Power and Module Cooling Considerations

The 1260-22 is a high density, high power switch module capable of switching high current levels. Because of this certain precautions should be applied when using the switch module.

Module Power Calculation

The maximum power dissipation of the module needs to be considered for each application. The module power can be divided into three power components. They are the logic circuitry, the relays and the channel paths.

Logic Power

The first component, logic power is one of two fixed values depending on whether or not an Option –01T is installed. For a 1260-22 with an Option-01T installed the logic power is 8 Watts, and if no Option –01T is installed the logic power is 3 Watts.

Relay Power

The second component, relay power, depends on the number of relays that are energized and their duty cycle. A typical relay coil dissipates about 0.8 Watts. So in order to calculate the total power add the average power from each relay energized. The average power for each relay is 0.8 Watts times the duty cycle, t_{on} /(t_{on} + t_{off}). If t_{on} is much greater than 1 minute assume a Duty Cycle of 100%.

Channel Power

The third component is the channel power dissipation, which is calculated from the I^2R losses in each of the relay paths and the duty cycle for each path. A typical path resistance is approximately 0.020 Ohms. Therefore, the total power in the paths is the sum of the average power in each path. The average power is 0.02 times the path current squared, times the duty cycle, t_{on} /(t_{on} + t_{off}). If t_{on} is much greater than 1 minute assume a Duty Cycle of 100%.

To summarize the total Module Power refer to the following equation:

$$P_{TOTAL} = P_{LOGIC} + (P_{K1} + P_{K2} + P_{K3} + \ldots P_{K40}) + (P_{CH0} + P_{CH1} + P_{CH2} + \ldots P_{CH39})$$

Where:
- P_{LOGIC} = 8 Watts (With Option-01) or 3.0 Watts (Without Option-01)
- P_{Kn} = 0.8 Watts x D
- P_{CHm} = I^2 x 0.02 Ohms x D

And I = the channel current in Amps,

D = t_{on} /(t_{on} + t_{off}).

D = 100% if t_{on} >> 1 minute

The following is a typical example calculation. Assume that you have a 1260-22 Module with an Option –01T Installed and that there are ten paths used on the module and that each path is conducting 20 Amps each and each are conducting at a 50 % duty cycle. From the equation above

P_{TOTAL} **=** 8.0 W **+** (0.8 W x .5) x 10 relays + ($20A^2$ x 0.02Ω x.5) x 10 channels

P_{TOTAL} **=** 52.0 Watts

Note that if the same conditions existed except conducting at a 100% Duty cycle the total power would be 100.5 Watts! After the Module power is calculated the required airflow requirements must be evaluated.

Airflow Requirements

VXI Modules are specified to require a particular airflow to maintain a specific temperature rise. The air flow required and the resultant back pressure (pressure drop across the module) values determine a specific operating point that is plotted or compared against a VXI chassis cooling curve. If the operating point is below the chassis cooling curve, there is a high probability that the module will remain within its specified temperature rise. If the operating point lies above the chassis cooling curve the temperature rise may exceed the specified value.

The following procedure details how to calculate the cooling requirements for the 1260-22.

1. Determine the maximum temperature rise allowed across the module. This is typically 10 °C, but could be higher or lower depending the chassis ambient temperature, and the overall reliability requirements of the module.

2. Determine the required airflow to maintain the specified temperature rise of the module. This is calculated from the module power (calculated in previous section), the desired temperature rise, and the specific heat of air. For a given temperature rise the required air flow is:

   Airflow(liters/sec) = 0.83/Temp Rise(°C) x Module Power (Watts)

   As an example, for a 10 °C rise and a module power of 56.5 Watts:

   Airflow(liters/sec) = 0.83/10 °C x 56.5Watts = 4.7 liters/sec

3. Determine the pressure drop across the module when the

required airflow (liters/sec) is forced through the module. This can be determined by looking at pressure drop vs. airflow plot for the 1260-22 Module in **Figure 3-4**. Find the required airflow and then read the corresponding pressure in mm H_2O. For the case above, with an airflow of 4.7 liters/sec the pressure drop read from **Figure 3-4** is .4mm H_2O.

4. Plot the 1260-22 operating point (Pressure, Airflow) on the chassis cooling curve. If the module operating point lies under the chassis curve, the module should remain within the specified temperature. An example of a 1260-22 Module in a 1261B VXI Chassis is shown in **Figure 3-4**. The chassis airflow plotted is for the worst case slot airflow. In the 1261B chassis, the 1260-22 could dissipate up to about 65 Watts in any slot without much concern for the temperature rise of 10 °C being exceeded. **Above 65 Watts, special considerations must be given to cooling. Either more air must be forced through the slot or a temperature rise greater than 10°C will occur.**

CAUTION:

The required airflow may need to be increased or decreased depending on airflow distribution across the module, the ambient temperature and reliability issues. Consult the VXI specification for more details.

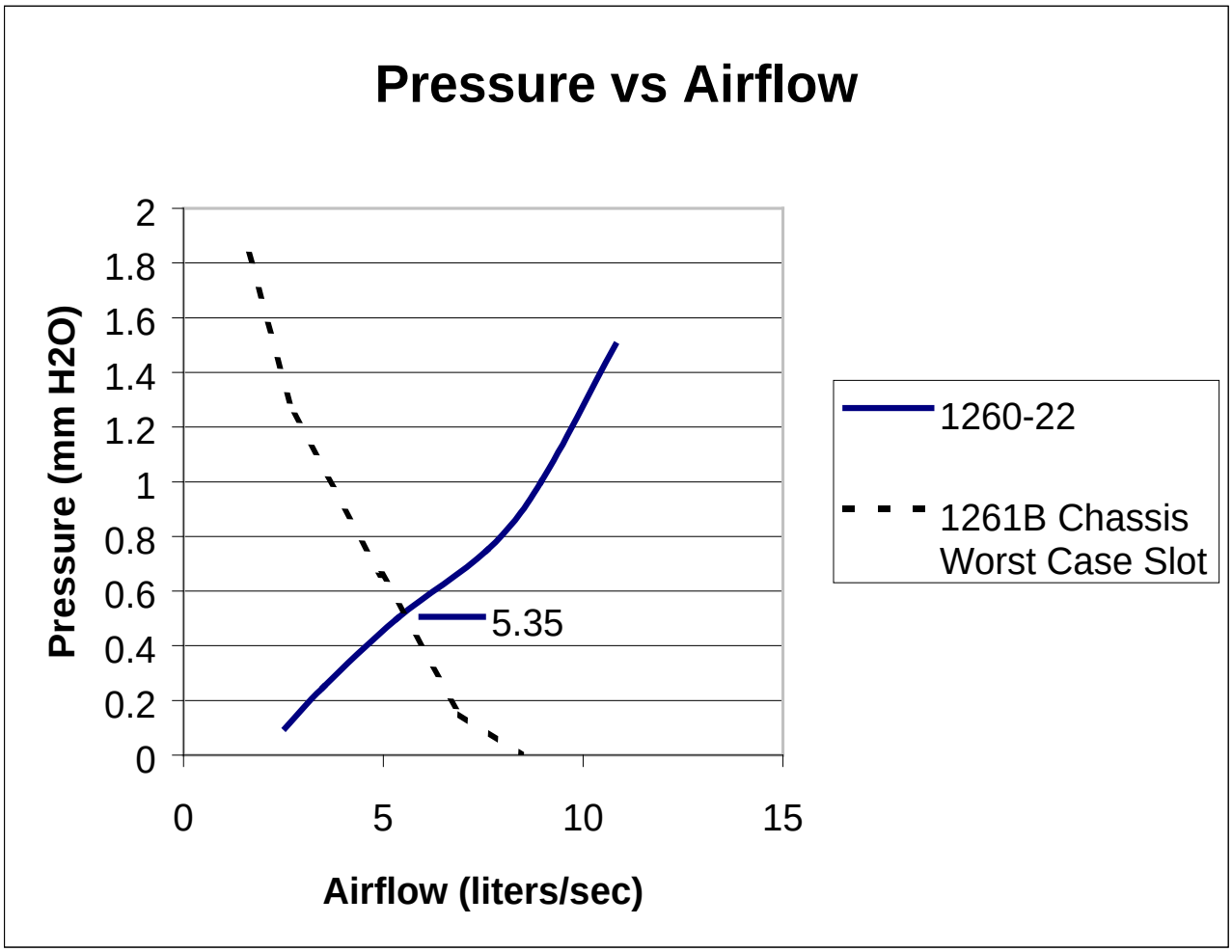


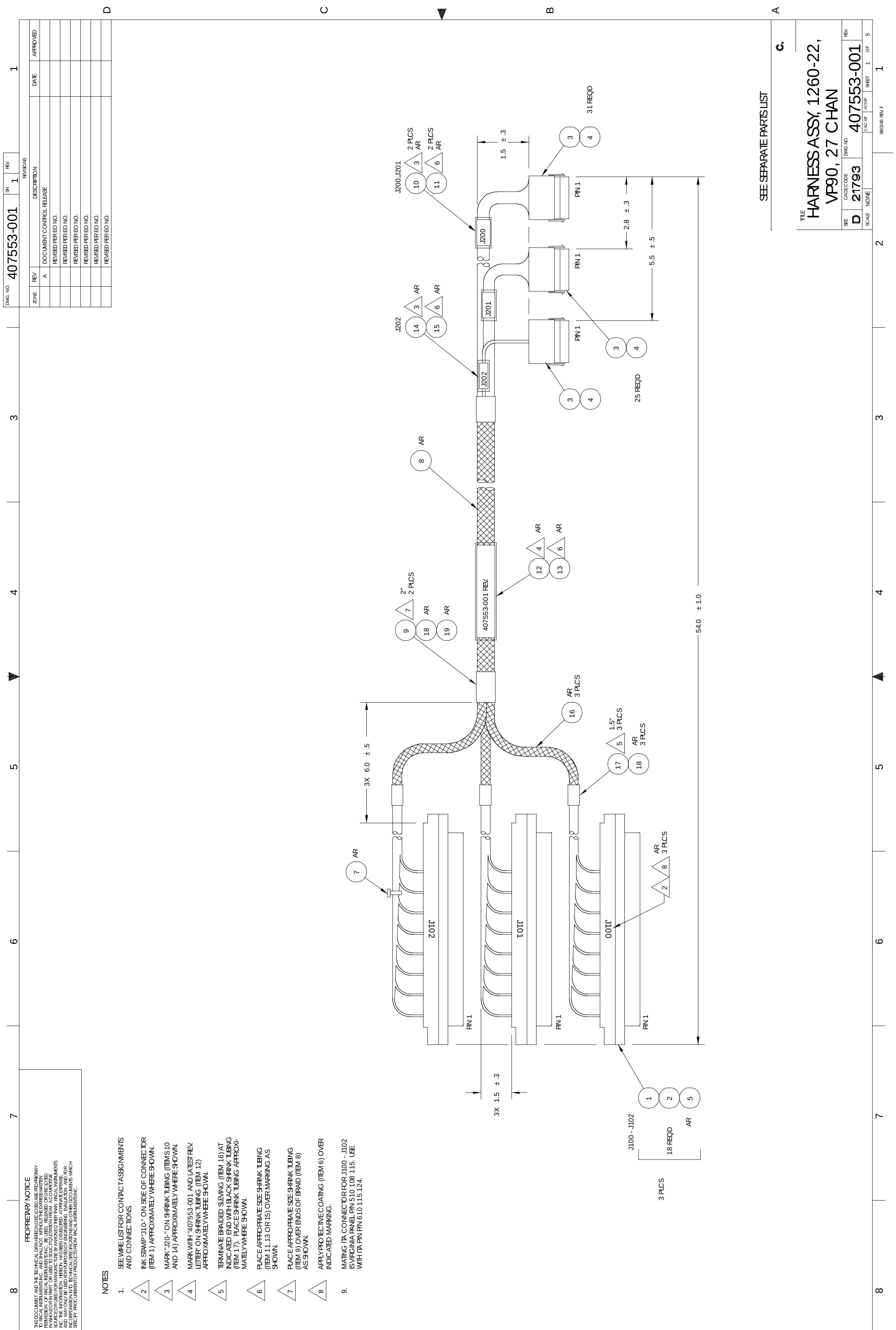
Figure 3-4, 1260-22/1261B Airflow Resistance Curves

This page was left intentionally blank.

Chapter 4
OPTIONAL ASSEMBLIES

Note: *In some cases, the reference documents may have been revised since the publication of this manual. If you have any questions or need further assistance, contact Customer Support.*

This page was left intentionally blank.


407553-001
REVISIONS
A DOCUMENT CONTROL RELEASE
REVISED PER ECO NO.
SEE SEPARATE PARTS LIST
HARNESS ASSY, 1260-22, VP90, 27 CHAN
D 21793 407553-001
SCALE NONE SHEET 1 OF 5
J200, J201
J202
J200
J201
J202
PIN 1
31 REQD
25 REQD
407553-001 REV.
54.0 ± 1.0
3X 6.0 ± .5
3X 1.5 ± .3
J100
J101
J102
J100 - J102
18 REQD
3 PLCS
PROPRIETARY NOTICE
NOTES:
1. SEE WIRE LIST FOR CONTACT ASSIGNMENTS AND CONNECTIONS.
2. INK STAMP "J10-" ON SIDE OF CONNECTOR (ITEM 1) APPROXIMATELY WHERE SHOWN.
3. MARK "J20-" ON SHRINK TUBING (ITEMS 10 AND 14) APPROXIMATELY WHERE SHOWN.
4. MARK WITH "407553-001 AND LATEST REV. LETTER ON SHRINK TUBING (ITEM 12) APPROXIMATELY WHERE SHOWN.
5. TERMINATE BRAIDED SLEEVING (ITEM 16) AT INDICATED END WITH BLACK SHRINK TUBING (ITEM 17). PLACE SHRINK TUBING APPROXIMATELY WHERE SHOWN.
6. PLACE APPROPRIATE SIZE SHRINK TUBING (ITEM 11,13 OR 15) OVER MARKING AS SHOWN.
7. PLACE APPROPRIATE SIZE SHRINK TUBING (ITEM 9) OVER ENDS OF BRAID (ITEM 8) AS SHOWN.
8. APPLY PROTECTIVE COATING (ITEM 6) OVER INDICATED MARKING.
9. MATING ITA CONNECTOR FOR J100 - J102 IS VIRGINIA PANEL P/N 510 108 115. USE WITH ITA P/N 610 115 124.

Assembly 407553-001 HARNESS A,1260-22, VP90, 27CH Rev Date 2/18/99 Revision A

#	Component	Description	U/M	Oty Reqd	Ref
1	602201-006	CQN-RCV-PLG019C. ---S-VP90	EA	3.00000	J100-J102
2	602201-903	CONTACT, PWR, MINI, 8AWG, VP9O	EA	57.00000	W/J100-J102
3	602345	CON-CAB-RCP030C. 197 20A	EA	3.00000	W/J200-J202
4	602346	CONTACT, SOLDER, 12GA	EA	57.00000	W/J200-202
5	500271-999	WRTEF-STR14G-9-9-9 WHT	FT	.00001	
6	910541	POLYURETHANE CONFORMAL COAT	EA	.00001	
7	610897	TIE-CA-LKG-. 062-1.25	EA	.00001	
8	GRP-110-3/4	TBGWOV-POY. 500ID-BLACK	FT	.00001	
9	500226	TBGSRK-POF1 . 50ID-BLACK	FT	.00001	
10	M23053/5-109-4	TBGSRK-POF - 750ID-YELLOW	FT	.00001	
11	M23053/5-209-C	TBGSRK-POF. 750ID-CLEAR	FT	.00001	
12	M23053/5-111-4	TBGSRK-POF1 .50ID-YELLOW	FT	.00001	
13	M23053/5-211-C	TBGSRK-POF1 . 50ID-CLEAR	FT	.00001	
14	M23053/5-106-4	TBGSRK-POF. 250ID-YELLOW	FT	.00001	
15	500140	TBGSRK-POF. 250ID-CLEAR	FT	.00001	
16	GRP-110-1/2	TBGWOV-POY. 250ID-BLACK	FT	.00001	
17	500017	TBGSRK-POF. 500ID-BLACK	FT	.00001	
18	500005	TIE CORD NYLON	FT	.00001	
19	921460	TAPE,THERMOPLASTIC, 3/4x .01IN	EA	.00001	

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
	BLK AA (J100)	Uxx-SLOTyy	CABLE	407553-001		SYSTEM WIRE UST
	BLK AA (J101)	Uxx-SLOTyy	CABLE	407553-001		
	BLK AA (J102)	Uxx-SLOTyy	CABLE	407553-001		

This system wirelist serves as a template for incorporating this harness assembly into the overall system wirelist. It does not in any way affect the fabrication of this harness assembly.

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90,27CH	A	21793	407553-001	A
	DRN			SHEET 2 of 5

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
1	J100-1	J200-11	14AWG	500271-	54"	CHANNEL 00 IN
	602201-903	602346	WHT	999		
2	J100-2	J200-1	14 AWG	500271-	54"	CHANNEL 00 OUT
	602201-903	602346	WHT	999		
3	J100-3	J200-22	14 AWG	500271-	54"	CHANNEL 01 IN
	602201-903	602346	WHT	999		
4	3100-4	J200-21	14 AWG	500271-	54"	CHANNEL 01 OUT
	602201-903	602346	WHT	999		
5	J100-5	J200-2	14 AWG	500271-	54"	CHANNEL 02 IN
	602201-903	602346	WHT	999		
6	J100-6	J200-12	14AWG	500271-	54"	CHANNEL 02 OUT
	602201-903	602346	WHT	999		
7	J100-7	J200-13	14AWG	500271-	54"	CHANNEL 03 IN
	602201-903	602346	WHT	999		
8	J100-8	J200-3	14 AWG	500271-	54"	CHANNEL 03 OUT
	602201-903	602346	WHT	999		
9	J100-9	J200-24	14 AWG	500271-	54"	CHANNEL 04 IN
	602201-903	602346	WHT	999		
10	J100-10	J200-23	14AWG	500271-	54"	CHANNEL 04 OUT
	602201-903	602346	WHT	999		
11	J100-11	J200-4	14AWG	500271-	54"	CHANNEL 05 IN
	602201-903	602346	WHT	999		
12	J100-12	J200-14	14AWG	500271-	54"	CHANNEL 05 OUT
	602201-903	602346	WHT	999		
13	J100-13	J200-15	14AWG	500271-	54"	CHANNEL 06 IN
	602201-903	602346	WHT	999		
14	J100-14	J200-5	14AWG	500271-	54"	CHANNEL 06 OUT
	602201-903	602346	WHT	999		
15	J100-15	J200-26	14AWG	500271-	54"	CHANNEL 07 IN
	602201-903	602346	WHT	999		
16	J100-16	J200-25	14AWG	500271-	54"	CHANNEL 07 OUT
	602201-903	602346	WHT	999		
17	J100-17	J200-6	14 AWG	500271-	54"	CHANNEL 08 IN
	602201-903	602346	WHT	999		
18	J100-18	J200-16	14AWG	500271-	54"	CHANNEL 08 OUT
	602201-903	602346	WHT	999		
19	J100-19	J201-5	14AWG	500271-	54"	CHASSIS GROUND
	602201-903	602346	WHT	999		
20	J101-1	J200-17	14AWG	500271-	54"	CHANNEL 09 IN
	602201-903	602346	WHT	999		
21	J101-2	J200-7	14AWG	500271-	54"	CHANNEL 09 OUT
	602201-903	602346	WHT	999		
22	J101-3	J200-28	14AWG	500271-	54"	CHANNEL 10 IN
	602201-903	602346	WHT	999		
23	J101-4	J200-27	14AWG	500271-	54"	CHANNEL 10 OUT
	602201-903	602346	WHT	999		
24	J101-5	J200-8	14AWG	500271	54"	CHANNEL 11 IN
	602201-903	602346	WHT	999		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90,27CH	A	21793	407553-001	A
	DRN			SHEET 3 of 5

ENGINEERING WIRE LIST

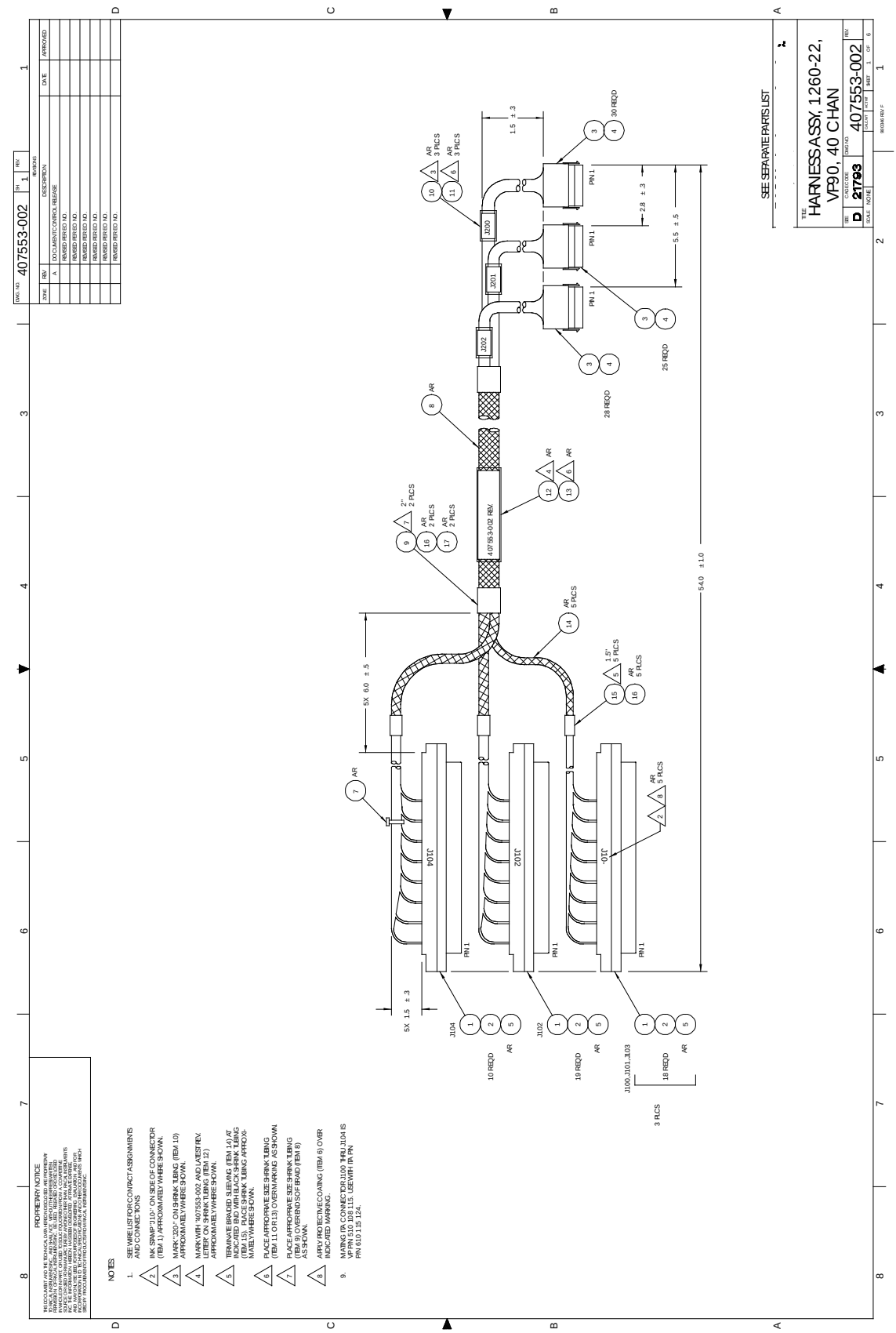
WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
25	J101-6 602201-903	J200-18 602346	14AWG WHT	500271- 999	54"	CHANNEL 11 OUT
26	J101-7 602201-903	J200-19 602346	14AWG WHT	500271- 999	54"	CHANNEL 12 IN
27	J101-8 602201-903	J200-9 602346	14AWG WHT	500271- 999	54"	CHANNEL 12 OUT
28	J101-9 602201-903	J200-30 602346	14AWG WHT	500271- 999	54"	CHANNEL 13 IN
29	J101-10 602201-903	J200-29 602346	14AWG WHT	500271- 999	54"	CHANNEL 13 OUT
30	J101-11 602201-903	J200-10 602346	14AWG WHT	500271- 999	54"	CHANNEL 14 IN
31	J101-12 602201-903	J200-20 602346	14AWG WHT	500271- 999	54"	CHANNEL 14 OUT
32	J101-13 602201-903	J201-11 602346	14AWG WHT	500271- 999	54"	CHANNEL 15 IN
33	J101-14 602201-903	J201-1 602346	14AWG WHT	500271- 999	54"	CHANNEL 15 OUT
34	J101-15 602201-903	J201-22 602346	14AWG WHT	500271- 999	54"	CHANNEL 16 IN
35	J101-16 602201-903	J201-21 602346	14AWG WHT	500271- 999	54"	CHANNEL 16 OUT
36	J101-17 602201-903	J201-2 602346	14AWG WHT	500271- 999	54"	CHANNEL 17 IN
37	J101-18 602201-903	J201-12 602346	14AWG WHT	500271- 999	54"	CHANNEL 17 OUT
38	J101-19 602201-903	J202-29 602346	14AWG WHT	500271- 999	54"	EXTERNAL RESET
39	J102-1 602201-903	J201-13 602346	14AWG WHT	500271- 999	54"	CHANNEL 18 IN
40	J102-2 602201-903	J201-3 602346	14 AWG WHT	500271- 999	54"	CHANNEL 18 OUT
41	J102-3 602201-903	J201-24 602346	14AWG WHT	500271- 999	54"	CHANNEL 19 IN
42	J102-4 602201-903	J201-23 602346	14AWG WHT	500271- 999	54"	CHANNEL 19 OUT
43	J102-5 602201-903	J201-4 602346	14AWG WHT	500271- 999	54"	CHANNEL 20 IN
44	J102-6 602201-903	J201-14 602346	14AWG WHT	500271- 999	54"	CHANNEL 20 OUT
45	J102-7 602201-903	J201-17 602346	14AWG WHT	500271- 999	54"	CHANNEL 21 IN
46	J102-8 602201-903	J201-7 602346	14AWG WHT	500271- 999	54"	CHANNEL 21 OUT
47	J102-9 602201-903	J201-28 602346	14AWG WHT	500271- 999	54"	CHANNEL 22 IN
48	J102-10 602201-903	J201-27 602346	14AWG WHT	500271- 999	54"	CHANNEL 22 OUT

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90,27CH	A	21793	407553-001	A
	DRN			SHEET 4 of 5

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
49	J102-11 602201-903	J201-8 602346	14AWG WHT	500271- 999	54"	CHANNEL 23 IN
50	J102-12 602201-903	J201-18 602346	14AWG WHT	500271- 999	54"	CHANNEL 23 OUT
51	J102-13 602201-903	J201-19 602346	14AWG WHT	500271- 999	54"	CHANNEL 24 IN
52	J102-14 602201-903	J201-9 602346	14AWG WHT	500271- 999	54"	CHANNEL 24 OUT
53	J102-15 602201-903	J201-30 602346	14AWG WHT	500271- 999	54"	CHANNEL 25 IN
54	J102-16 602201-903	J201-29 602346	14AWG WHT	500271- 999	54"	CHANNEL 25 OUT
54	J102-17 602201-903	J201-10 602346	14AWG WHT	500271- 999	54"	CHANNEL 26 IN
56	J102-18 602201-903	J201-20 602346	14AWG WHT	500271- 999	54"	CHANNEL 26 OUT
57	J102-19 602201-903	J202-30 602346	14AWG WHT	500271- 999	54"	RESET RETURN

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90,27CH	A	21793	407553-001	A
	DRN			SHEET 5 of 5


DWG NO 407553-002
REV 1
REVISIONS
ZONE REV DESCRIPTION DATE APPROVED
A DOCUMENT CONTROL RELEASE
REVISED PER ECO
SEE SEPARATE PARTS LIST
HARNESS ASSY, 1260-22, VP90, 40 CHAN
SIZE D
CAGE CODE 21793
DWG NO 407553-002
REV
SCALE NONE
SHEET 1 OF 6
NOTES:
1. SEE WIRE LIST FOR CONTACT ASSIGNMENTS AND CONNECTIONS
2 INK STAMP "J110." ON SIDE OF CONNECTOR (ITEM 1) APPROXIMATELY WHERE SHOWN.
3 MARK "J20." ON SHRINK TUBING (ITEM 10) APPROXIMATELY WHERE SHOWN.
4 MARK WITH "407553-002" AND LATEST REV. LETTER ON SHRINK TUBING (ITEM 12) APPROXIMATELY WHERE SHOWN.
5 TERMINATE BRAIDED SLEEVING (ITEM 14) AT INDICATED END WITH BLACK SHRINK TUBING (ITEM 15). PLACE SHRINK TUBING APPROXIMATELY WHERE SHOWN.
6 PLACE APPROPRIATE SIZE SHRINK TUBING (ITEM 11 OR 13) OVER MARKING AS SHOWN.
7 PLACE APPROPRIATE SIZE SHRINK TUBING (ITEM 11) OVER END OF BRAID (ITEM 8) AS SHOWN.
8 APPLY PRO TECT NEO COATING (ITEM 6) OVER INDICATED MARKING.
9. MATING I/O CONNECTOR J100 THRU J104 IS VPCH90-115-1-01. USE WITH PIN PN 610 115 124.
J104
J102
J10-
J200
J201
J202
PIN 1
5X 6.0 ±5
5X 1.5 ±3
1.5 ±3
2.8 ±3
5.5 ±5
540 ±10
10 REQD
19 REQD
18 REQD
3 PLCS
28 REQD
25 REQD
30 REQD
AR
2 PLCS
3 PLCS
5 PLCS
1.5"
2"
407553-002 REV.

Assembly 407553-002 HARNESS A,1260-22,VP90 ,40CH Rev Date 2/18/99 Revision A

#	Component	Description	U/N	Qty Reqd	Ref
1	602201-006	CON-RCV-PLGO19C. ---S-VP90	EA	5.00000	J100-J104
2	602201-903	CONTACT, PWR,MINI, 8AWG,VP90	EA	83.00000	W/J100-J104
3	602345	CON-CAB-RCPO3OC. 197 20A	EA	3.00000	J200-J202
4	602346	CONTACT, SOLDER, 12GA	EA	83.00000	W/J200-J202
5	500271-999	WRTEF-STRI4G-9-9-9 WHT	FT	.00001	
6	910541	POLYURETHANE CONFORNAL COAT	EA	.00001	
7	610897	TIE-CA-LKG-. 062-1.25	EA	.00001	
8	GRP-110-3/4	TBGWOV-POY. 500ID-BLACK	FT	.00001	
9	500226	TBGSRK-POF1 . 50ID-BLACK	FT	.00001	
10	M23053/5-109-4	TBGSRK-POF. 750ID-YELLOW	FT	.00001	
11	M23053/5-209-C	TBGSRK-POF. 750ID-CLEAR	FT	.00001	
12	M23053/5-111-4	TBGSRK-POF1 . 50ID-YELLOW	FT	.00001	
13	M23053/5-211-C	TBGSRK-POFI . 50ID-CLEAR	FT	.00001	
14	GRP-110-1/2	TBGWOV- POY. 250ID-BLACK	FT	.00001	
15	500017	TBGSRK-POF. 500ID-BLACK	FT	.00001	
16	500005	TIE CORD NYLON	FT	.00001	
17	921460	TAPE, THERNOPLASTIC, 3/4x .01IN	EA	.00001	

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
	BLK AA (J100)	Uxx-SLOTyy	CABLE	407553-002		SYSTEM WIRE LIST
	BLK AA (J101)	Uxx-SLOTyy	CABLE	407553-002		
	BLK AA (J102)	Uxx-SLOTyy	CABLE	407553-002		
	BLK AA (J103)	Uxx-SLOTyy	CABLE	407553-002		
	BLK AA (J104)	Uxx-SLOTyy	CABLE	407553-002		

This system wirelist serves as a template for incorporating this harness assembly into the overall system wirelist. It does not in any way affect the fabrication of this harness assembly.

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90, 40CH	A	21793	407553-002	A
	DRN			SHEET 2 of 6

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
1	J100-1 602201-903	J200-11 602346	14AWG WHT	500271- 999	54"	CHANNEL 00 IN
2	J100-2 602201-903	J200-1 602346	14AWG WHT	500271- 999	54"	CHANNEL 00 OUT
3	J100-3 602201-903	J200-22 602346	14 AWG WHT	500271- 999	54"	CHANNEL 01 IN
4	J100-4 602201-903	J200-21 602346	14AWG WHT	500271- 999	54"	CHANNEL 01 OUT
5	J100-5 602201-903	J200-2 602346	14AWG WHT	500271- 999	54"	CHANNEL 02 IN
6	J100-6 602201-903	J200-12 602346	14AWG WHT	500271- 999	54"	CHANNEL 02 OUT
7	J100-7 602201-903	J200-13 602346	14AWG WHT	500271- 999	54"	CHANNEL 03 IN
8	J100-8 602201-903	J200-3 602346	14AWG WHT	500271- 999	54"	CHANNEL 03 OUT
Th	J100-9 602201-903	J200-24 602346	14 AWG WHT	500271- 999	54"	CHANNEL 04 IN
10	J100-10 602201-903	J200-23 602346	14AWG WHT	500271- 999	54"	CHANNEL 04 OUT
11	J100-11 602201-903	J200-4 602346	14AWG WHT	500271- 999	54"	CHANNEL 05 IN
12	J100-12 602201-903	J200-14 602346	14AWG WHT	500271- 999	54"	CHANNEL 05 OUT
13	J100-13 602201-903	J200-15 602346	14AWG WHT	500271- 999	54"	CHANNEL 06 IN
14	J100-14 602201-903	J200-5 602346	14AWG WHT	500271- 999	54"	CHANNEL 06 OUT
15	J100-15 602201-903	J200-26 602346	14AWG WHT	500271- 999	54"	CHANNEL 07 IN
16	J100-16 602201-903	J200-25 602346	14AWG WHT	500271- 999	54"	CHANNEL 07 OUT
17	J100-17 602201-903	J200-6 602346	14 AWO WHT	500271- 999	54"	CHANNEL 08 IN
18	J100-18 602201-903	J200-16 602346	14AWG WHT	500271- 999	54"	CHANNEL 08 OUT
19	J100-19 NO CONNECT					
20	J101-1 602201-903	J200-17 602346	14AWG WHT	500271- 999	54"	CHANNEL 09 IN
21	J101-2 602201-903	J200-7 602346	14AWG WHT	500271- 999	54"	CHANNEL 09 OUT
22	J101-3 602201-903	J200-28 602346	14AWG WHT	500271- 999	54"	CHANNEL 10 IN
23	J101-4 602201-903	J200-27 602346	14AWG WHT	500271- 999	54"	CHANNEL 10 OUT
24	J101-5 602201-903	J200-8 602346	14AWG WHT	500271- 999	54"	CHANNEL 11 IN

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90, 40CH	A	21793	407553-002	A
	DRN			SHEET 3 of 6

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
25	J101-6 602201-903	J200-18 602346	I4AWG WHT	500271- 999	54"	CHANNEL 11 OUT
26	J101-7 602201-903	J200-19 602346	14AWG WHT	500271- 999	54"	CHANNEL 12 IN
27	J101-8 602201-903	J200-9 602346	14AWG WHT	500271- 999	54"	CHANNEL 12 OUT
28	J101-9 602201-903	J200-30 602346	14AWG WHT	500271- 999	54"	CHANNEL 13 IN
29	J101-10 602201-903	J200-29 602346	14AWG WHT	500271- 999	54"	CHANNEL 13 OUT
30	J101-11 602201-903	J200-10 602346	14AWG WHT	500271- 999	54"	CHANNEL 14 IN
31	J101-12 602201-903	J200-20 602346	14AWG WHT	500271- 999	54"	CHANNEL 14 OUT
32	J101-13 602201-903	J201-11 602346	14AWG WHT	500271- 999	54"	CHANNEL 15 IN
33	J101-14 602201-903	J201-1 602346	14AWG WHT	500271- 999	54"	CHANNEL 15 OUT
34	J101-15 602201-903	J201-22 602346	14AWG WHT	500271- 999	54"	CHANNEL 16 IN
35	J101-16 602201-903	J201-21 602346	14AWG WHT	500271- 999	54"	CHANNEL 16 OUT
36	J101-17 602201-903	J201-2 602346	14AWG WHT	500271- 999	54"	CHANNEL 17 IN
37	J101-18 602201-903	J201-12 602346	14AWG WHT	500271- 999	54"	CHANNEL 17 OUT
38	J101-19 NO CONNECT					
39	J102-1 602201-903	J201-13 602346	14AWG WHT	500271- 999	54"	CHANNEL 18 IN
40	J102-2 602201-903	J201-3 602346	14AWG WHT	500271- 999	54"	CHANNEL 18 OUT
41	J102-3 602201-903	J201-24 602346	14AWG WHT	500271- 999	54"	CHANNEL 19 IN
42	J102-4 602201-903	J201-23 602346	14AWG WHT	500271- 999	54"	CHANNEL 19 OUT
43	J102-5 602201-903	J201-4 602346	14AWG WHT	500271- 999	54"	CHANNEL 20 IN
44	J102-6 602201-903	J201-14 602346	14AWG WHT	500271- 999	54"	CHANNEL 20 OUT
45	J102-7 602201-903	J201-17 602346	14AWG WHT	500271- 999	54"	CHANNEL 21 IN
46	J102-8 602201-903	J201-7 602346	14AWG WHT	500271- 999	54"	CHANNEL 21 OUT
47	J102-9 602201-903	J201-28 602346	I4AWG WHT	500271- 999	54"	CHANNEL 22 IN
48	J102-10 602201-903	J201-27 602346	14AWG WHT	500271- 999	54"	CHANNEL 22 OUT

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90, 40CH	A	21793	407553-002	A
	DRN			SHEET 4 of 6

ENGINEERING WIRE LIST

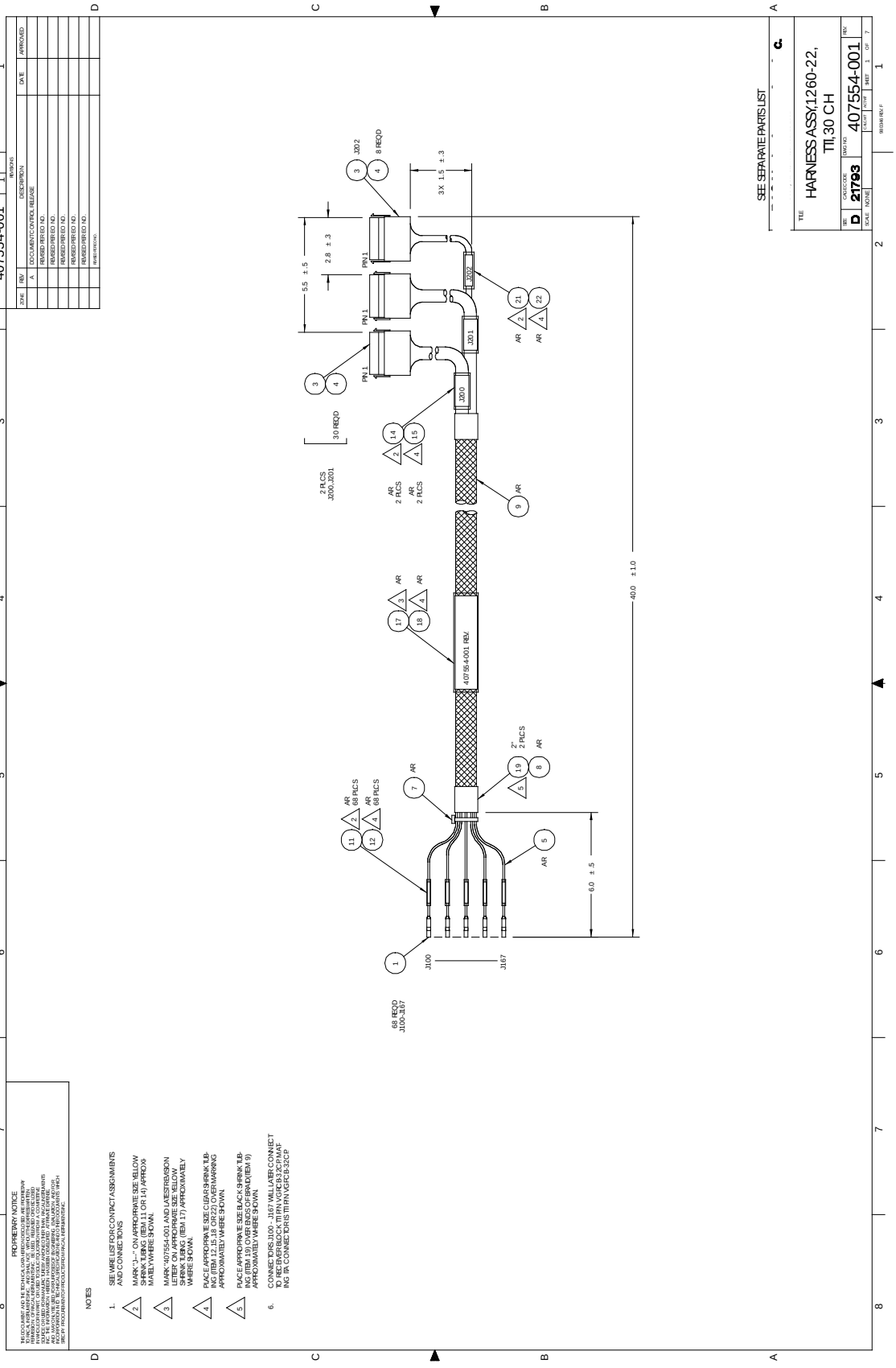
WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
49	J102-11 602201-903	J201-8 602346	14AWG WHT	500271- 999	54"	CHANNEL 23 IN
50	J102-12 602201-903	J201-18 602346	14AWG WHT	500271- 999	54"	CHANNEL 23 OUT
51	J102-13 602201-903	J201-19 602346	14AWG WHT	500271- 999	54"	CHANNEL 24 IN
52	J102-14 602201-903	J201-9 602346	14AWG WHT	500271- 999	54"	CHANNEL 24 OUT
53	J102-15 602201-903	J201-30 602346	14AWG WHT	500271- 999	54"	CHANNEL 25 IN
54	J102-16 602201-903	J201-29 602346	14AWG WHT	500271- 999	54"	CHANNEL 25 OUT
54	J102-17 602201-903	J201-10 602346	14AWG WHT	500271- 999	54"	CHANNEL 26 IN
56	J102-18 602201-903	J201-20 602346	14AWG WHT	500271- 999	54"	CHANNEL 26 OUT
57	J102-19 602201-903	J201-5 602346	14 AWG WHT	500271- 999	54"	CHASSIS GROUND
58	J103-1 602201-903	J202-11 602346	14AWG WHT	500271- 999	54"	CHANNEL 27 IN
59	J103-2 602201-903	J202-1 602346	14AWG WHT	500271- 999	54"	CHANNEL 27 OUT
60	J103-3 602201-903	J202-22 602346	14AWG WHT	500271- 999	54"	CHANNEL 28 IN
61	J103-4 602201-903	J202-21 602346	14 AWG WHT	500271- 999	54"	CHANNEL 28 OUT
62	J103-5 602201-903	J202-2 602346	14AWG WHT	500271- 999	54"	CHANNEL 29 IN
63	J103-6 602201-903	J202-12 602346	14AWG WHT	500271- 999	54"	CHANNEL 29 OUT
64	J103-7 602201-903	J202-13 602346	14AWG WHT	500271- 999	54"	CHANNEL 30 IN
65	J103-8 602201-903	J202-3 602346	14AWG WHT	500271- 999	54"	CHANNEL 30 OUT
66	J103-9 602201-903	J202-24 602346	14 AWG WHT	500271- 999	54"	CHANNEL 31 IN
67	J103-10 602201-903	J202-23 602346	14 AWG WHT	500271- 999	54"	CHANNEL 31 OUT
68	J103-11 602201-903	J202-4 602346	14AWG WHT	500271- 999	54"	CHANNEL 32 IN
69	J103-12 602201-903	J202-14 602346	14AWG WHT	500271- 999	54"	CHANNEL 32 OUT
70	J103-13 602201-903	J202-15 602346	14AWG WHT	500271- 999	54"	CHANNEL 33 IN
71	J103-14 602201-903	J202-5 602346	I4AWG WHT	500271- 999	54"	CHANNEL 33 OUT
72	J103-15 602201-903	J202-26 602346	14AWG WHT	500271- 999	54"	CHANNEL 34 IN

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90, 40CH	A	21793	407553-002	A
	DRN			SHEET 5 of 6

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
73	J103-16 602201-903	J202-25 602346	14AWG WHT	500271- 999	54"	CHANNEL 34 OUT
74	J103-17 602201-903	J202-6 602346	14 AWG WHT	500271- 999	54"	CHANNEL 35 IN
75	J103-18 602201-903	J202-16 602346	14AWG WHT	500271- 999	54"	CHANNEL 35 OUT
76	J103-19 NO CONNECT					
77	J104-1 602201-903	J202-17 602346	14AWG WHT	500271- 999	54"	CHANNEL 36 IN
78	J104-2 602201-903	J202-7 602346	14AWG WHT	500271- 999	54"	CHANNEL 36 OUT
79	J104-3 602201-903	J202-28 602346	14AWG WHT	500271- 999	54"	CHANNEL 37 IN
80	J104-4 602201-903	J202-27 602346	14 AWG WHT	500271- 999	54"	CHANNEL 37 OUT
81	J104-5 602201-903	J202-8 602346	14 AWG WHT	500271- 999	54"	CHANNEL 38 IN
82	J104-6 602201-903	J202-18 602346	14AWG WHT	500271- 999	54"	CHANNEL 38 OUT
83	J104-7 602201-903	J202-19 602346	14AWG WHT	500271- 999	54"	CHANNEL 39 IN
84	J104-8 602201-903	J202-9 602346	14AWG WHT	500271- 999	54"	CHANNEL 39 OUT
85	J104-9 602201-903	J202-29 602346	14 AWG WHT	500271- 999	54"	EXTERNAL RESET
86	J104-10 602201-903	J202-30 602346	14AWG WHT	500271- 999	54"	RESET RETURN
87	J104-11 NO CONNECT					
88	J104-12 NO CONNECT					
89	J104-13 NO CONNECT					
90	J104-14 NO CONNECT					
91	J104-15 NO CONNECT					
92	J104-16 NO CONNECT					
93	J104-17 NO CONNECT					
94	J104-18 NO CONNECT					
95	J104-19 NO CONNECT					

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,VP90, 40CH	A	21793	407553-002	A
	DRN			SHEET 6 of 6


DWG NO. 407554-001
REVISIONS
ZONE REV DESCRIPTION DATE APPROVED
A DOCUMENT CONTROL RELEASE
REVISED PER ECO NO.
SEE SEPARATE PARTS LIST
TITLE HARNESS ASSY,1260-22, TII,30 CH
SIZE D CAGE CODE 21793 DWG NO. 407554-001 REV
SCALE NONE WEIGHT POUNDS SHEET 1 OF 2
NEXT ASSY
PROPRIETARY NOTICE
NOTES
1. SEE WIRE LIST FOR CONTACT ASSIGNMENTS AND CONNECTIONS
2 MARK "J---" ON APPROPRIATE SIZE YELLOW SHRINK TUBING (ITEM 11 OR 14) APPROX MATELY WHERE SHOWN.
3 MARK "407554-001 AND LATEST REVISION LETTER" ON APPROPRIATE SIZE YELLOW SHRINK TUBING (ITEM 17) APPROXIMATELY WHERE SHOWN.
4 PLACE APPROPRIATE SIZE CLEAR SHRINK TUBING (ITEM 12,15,18,OR 22) OVER MARKING APPROXIMATELY WHERE SHOWN.
5 PLACE APPROPRIATE SIZE BLACK SHRINK TUBING (ITEM 19) OVER ENDS OF FIBER (ITEM 9) APPROXIMATELY WHERE SHOWN.
6. CONNECTORS J100 - J167 MILL-MAX CONNECT TO RECEIVER BLOCK TII PN VGRCB-32CP. MATING TII CONNECTOR IS TII PN VGRC-B-32CP
J100
J167
68 REQD J100-J167
J200
J201
J202
3.0 REQD
8 REQD
2 PLCS J200, J201
AR 2 PLCS
AR 68 PLCS
2" 2 PLCS
AR
5.5 ±.5
2.8 ±.3
3 X 1.5 ±.3
6.0 ±.5
40.0 ±1.0
407554-001 REV.

Assembly 407554-001 HARNESS A,1260-22,TTI, 30CH Rev Date 2/18/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
1	602196-901	CONTACT, PWR,MINI, 20A,TTI	EA	68.00000	J100-J167
3	602345	CON-CAB-RCP030C. 197 20A	EA	3.00000	J200-J202
4	602346	CONTACT, SOLDER, 12GA	EA	68.00000	W/J200-J202
5	500271-999	WRTEF-STR14G-9-9-9 WHT	FT	.00001	
7	610897	TIE-CA-LKG-. 062-1.25	EA	.00001	
8	500005	TIE CORD NYLON	FT	.00001	
9	GRP-110-3/4	TBGWOV-POY. 500 ID-BLACK	FT	.00001	
11	M23053/5-104-4	TBGSRK-POF. 13ID-YELLOW	FT	.00001	
12	M23053/5-204-C	TBGSRK-POF. 125ID-CLEAR	FT	.00001	
14	M23053/5-109-4	TBGSRK-POF. 750ID-YELLOW	FT	.00001	
15	500104	TBGSRK-POF. 750ID-CLEAR	FT	.00001	
17	M23053/5-111-4	TBGSRK-POF1. 50ID-YELLOW	FT	.00001	
18	M23053/5-211-C	TBGSRK-POF1 . 50ID-CLEAR	FT	.00001	
19	500226	TBGSRK-POF1 - 50ID-BLACK	FT	.00001	
21	M23053/5-107-4	TBGSRK-POF. 375ID-YELLOW	FT	.00001	
22	M23053/5-207-C	TBGSRK-POF. 375ID-CLEAR	EA	.00001	

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
	BLK AAx PN 01 (J100)	Uxx-SLOT yy (J200)	CABLE	407554-001		SYSTEM WIRE LIST
	BLK AAx PN 02 (J101)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 03 (J102)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 04 (J103)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 05 (J104)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 06 (J105)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 07 (J106)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 08 (J107)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 09 (J108)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 10 (J109)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 11 (J110)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 12 (J111)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 13 (J112)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 14 (J113)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 15 (J114)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 16 (J115)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 17 (J116)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 18 (J117)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 19 (J118)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 20 (J119)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 21 (J120)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 22 (J121)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 23 (J122)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 24 (J123)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 25 (J124)	Uxx-SLOT yy (J200)	CABLE	407554-001		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 30CH	A	21793	407554-001	A

	DRN		SHEET 2 of 7

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
	BLK AAx PN 26 (J125)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 27 (J126)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 28 (J127)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 29 (J128)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 30 (J129)	Uxx-SLOT yy (J200)	CABLE	407554-001		
	BLK AAx PN 31 (J130)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 32 (J131)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 33 (J132)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 34 (J133)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 35 (J134)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 36 (J135)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 37 (J136)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 38 (J137)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 39 (J138)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 40 (J139)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 41 (J140)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 42 (J141)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 43 (J142)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 44 (J143)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 45 (J144)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 46 (J145)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 47 (J146)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 48 (J147)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 49 (J148)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 50 (J149)	Uxx-SLOT yy (J201)	CABLE	407554-001		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 30CH	A	21793	407554-001	A

	DRN		SHEET 3 of 7

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
	BLK AAx PN 51 (J150)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 52 (J151)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 53 (J152)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 54 (J153)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 55 (J154)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 56 (J155)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 57 (J156)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 58 (J157)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AA~ PN 59 (J158)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 60 (J159)	Uxx-SLOT yy (J201)	CABLE	407554-001		
	BLK AAx PN 61 (J160)	Uxx-SLOT yy (J202)	CABLE	407554-001		
	BLK AAx PN 62 (J161)	Uxx-SLOT yy (J202)	CABLE	407554-001		
	BLK AAx PN 63 (J162)	Uxx-SLOT yy (J202)	CABLE	407554-001		
	BLK AAx PN 64 (J163)	Uxx-SLOT yy (J202)	CABLE	407554-001		
	BLK AAx PN 65 (J164)	Uxx-SLOT yy (J202)	CABLE	407554-001		
	BLK AAx PN 66 (J165)	Uxx-SLOT yy (J202)	CABLE	407554-001		
	BLK AAx PN 67 (J166)	Uxx-SLOT yy (J202)	CABLE	407554-001		
	BLK AAx PN 68 (J167)	Uxx-SLOT yy (J202)	CABLE	407554-001		

This system wirelist serves as a template for incorporating this harness assembly into the overall system wirelist. It does not in any way affect the fabrication of this harness assembly.

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 30CH	A	21793	407554-001	A
	DRN			SHEET 4 of 7

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART#	WIRE LEN	REFERENCE
1	J100	J200-11	14AWG	500271-	40"	CHANNEL 00 IN
	602196-901	602346	WHT	999		
2	J101	J200-1	14AWG	500271-	40"	CHANNEL 00 OUT
	602196-901	602346	WHT	999		
3	J102	J200-22	14AWG	500271-	40"	CHANNEL 01 IN
	602196-901	602346	WHT	999		
4	J103	J200-21	14AWO	500271-	40"	CHANNEL 01 OUT
	602196-901	602346	WHT	999		
5	J104	J200-2	14AWG	500271-	40"	CHANNEL 02 IN
	602196-901	602346	WHT	999		
6	J105	J200-12	14AWG	500271-	40"	CHANNEL 02 OUT
	602196-901	602346	WHT	999		
7	J106	J200-13	14AWG	500271-	40"	CHANNEL 03 IN
	602196-901	602346	WHT	999		
8	J107	J200-3	14AWG	500271-	40"	CHANNEL 03 OUT
	602196-901	602346	WHT	999		
9	J108	J200-24	14AWG	500271-	40"	CHANNEL 04 IN
	602196-901	602346	WHT	999		
10	J109	J200-23	14AWG	500271-	40"	CHANNEL 04 OUT
	602196-901	602346	WHT	999		
11	J110	J200-4	14AWG	500271-	40"	CHANNEL 05 IN
	602196-901	602346	WHT	999		
12	J111	J200-14	14AWG	500271-	40"	CHANNEL 05 OUT
	602196-901	602346	WHT	999		
13	J112	J200-15	14AWG	500271-	40"	CHANNEL 06 IN
	602196-901	602346	WHT	999		
14	J113	J200-5	14AWG	500271-	40"	CHANNEL 06 OUT
	602196-901	602346	WHT	999		
15	J114	J200-26	14AWG	500271-	40"	CHANNEL 07 IN
	602196-901	602346	WHT	999		
16	J115	J200-25	14AWG	500271-	40"	CHANNEL 07 OUT
	602196-901	602346	WHT	999		
17	J116	J200-6	14AWG	500271-	40"	CHANNEL 08 IN
	602196-901	602346	WHT	999		
18	J117	J200-16	14AWG	500271-	40"	CHANNEL 08 OUT
	602196-901	602346	WHT	999		
19	J118	J200-17	14AWG	500271-	40"	CHANNEL 09 IN
	602196-901	602346	WHT	999		
20	J119	J200-7	14AWG	500271-	40"	CHANNEL 09 OUT
	602196-901	602346	WHT	999		
21	J120	J200-28	14AWG	500271-	40"	CHANNEL 10 IN
	602196-901	602346	WHT	999		
22	J121	J200-27	14 AWG	500271-	40"	CHANNEL 10 OUT
	602196-901	602346	WHT	999		
23	J122	J200-8	14AWG	500271-	40"	CHANNEL 11 IN
	602196-901	602346	WHT	999		
24	J123	J200-18	14AWG	500271-	40"	CHANNEL 11 OUT
	602196-901	602346	WHT	999		
25	J124	J200-19	14AWG	500271-	40"	CHANNEL 12 IN
	602196-901	602346	WHT	999		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 30CH	A	21793	407554-001	A
	DRN			SHEET 5 of 7

ENGINEERING WIRE LIST

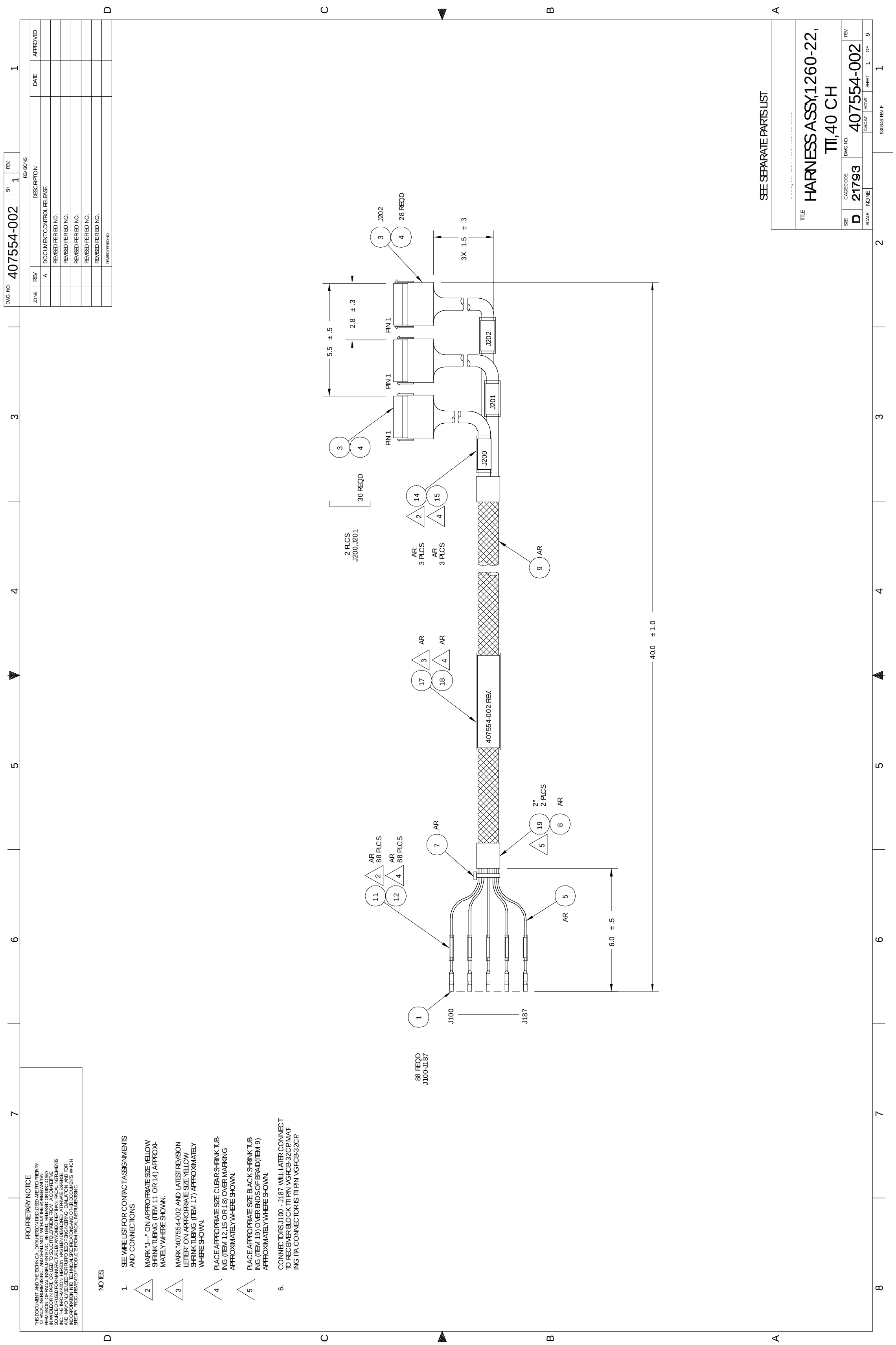
WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
26	J125	J200-9	14 AWO	500271-	40"	CHANNEL 12 OUT
	602196-901	602346	WHT	999		
27	J126	J200-30	14 AWO	500271-	40"	CHANNEL 13 IN
	602196-901	602346	WHT	999		
28	J127	J200-29	14AWG	500271-	40"	CHANNEL 13 OUT
	602196-901	602346	WHT	999		
29	J128	J200-10	14AWG	500271-	40"	CHANNEL 14 IN
	602196-901	602346	WHT	999		
30	J129	J200-20	14 AWG	500271-	40"	CHANNEL 14 OUT
	602196-901	602346	WHT	999		
31	J130	J201-11	14AWG	500271-	40"	CHANNEL 15 IN
	602196-901	602346	WHT	999		
32	J131	J201-1	14AWG	500271-	40"	CHANNEL 15 OUT
	602196-901	602346	WHT	999		
33	J132	J201-22	14AWG	500271-	40"	CHANNEL 16 IN
	602196-901	602346	WHT	999		
34	J133	J201-21	14AWG	500271-	40"	CHANNEL 16 OUT
	602196-901	602346	WHT	999		
35	J134	J201-2	14AWG	500271-	40"	CHANNEL 17 IN
	602196-901	602346	WHT	999		
36	J135	J201-12	14AWG	500271-	40"	CHANNEL 17 OUT
	602196-901	602346	WHT	999		
37	J136	J201-13	14AWG	500271-	40"	CHANNEL 18 IN
	602196-901	602346	WHT	999		
38	J137	J201-3	14AWG	500271-	40"	CHANNEL 18 OUT
	602196-901	602346	WHT	999		
39	J138	J201-24	14AWG	500271-	40"	CHANNEL 19 IN
	602196-901	602346	WHT	999		
40	J139	J201-23	14AWG	500271-	40"	CHANNEL 19 OUT
	602196-901	602346	WHT	999		
41	J140	J2014	14AWG	500271-	40"	CHANNEL 20 IN
	602196-901	602346	WHT	999		
42	J141	J201-14	14AWG	500271-	40"	CHANNEL 20 OUT
	602196-901	602346	WHT	999		
43	J142	J201-17	14AWG	500271-	40"	CHANNEL 21 IN
	602196-901	602346	WHT	999		
44	J143	J201-7	14AWG	500271-	40"	CHANNEL 21 OUT
	602196-901	602346	WHT	999		
45	J144	J201-28	I4AWG	500271-	40"	CHANNEL 22 IN
	602196-901	602346	WHT	999		
46	J145	J201-27	14 AWG	500271-	40"	CHANNEL 22 OUT
	602196-901	602346	WHT	999		
47	J146	J201-8	14AWG	500271-	40"	CHANNEL 23 IN
	602196-901	602346	WHT	999		
48	J147	J201-18	I4AWG	500271-	40"	CHANNEL 23 OUT
	602196-901	602346	WHT	999		
49	J148	J201-19	14AWG	500271-	40"	CHANNEL 24 IN
	602196-901	602346	WHT	999		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 30CH	A	21793	407554-001	A
	DRN			SHEET 6 of 7

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
50	J149 602196-901	J201-9 602346	14AWG WHT	500271- 999	40"	CHANNEL 24 OUT
51	J150 602196-901	J201-30 602346	14AWG WHT	500271- 999	40”	CHANNEL 25 IN
52	J151 602196-901	J201-29 602346	14AWG WHT	500271- 999	40"	CHANNEL 25 OUT
53	J152 602196-901	J201-10 602346	14AWG WHT	500271- 999	40"	CHANNEL 26 IN
54	J153 602196-901	J201-20 602346	14AWG WHT	500271- 999	40"	CHANNEL 26 OUT
55	J154 602196-901	J201-5 602346	14 AWG WHT	500271- 999	40"	CHASSIS GROUND
56	J155 602196-901	J201-6 602346	14AWG WHT	500271- 999	40”	CHASSIS GROUND
57	J156 602196-901	J201-15 602346	14AWG WHT	500271- 999	40"	CHASSIS GROUND
58	J157 602196-901	J201-16 602346	14AWG WHT	500271- 999	40"	CHASSIS GROUND
59	J158 602196-901	J201-25 602346	14AWG WHT	500271- 999	40"	CHASSIS GROUND
60	J159 602196-901	J201-26 602346	14 AWG WHT	500271- 999	40"	CHASSIS GROUND
61	J160 602196-901	J202-11 602346	14AWG WHT	500271- 999	40"	CHANNEL 27 IN
62	J161 602196-901	J202-1 602346	14AWG WHT	500271- 999	40"	CHANNEL 27 OUT
63	J162 602196-901	J202-22 602346	14AWG WHT	500271- 999	40"	CHANNEL 28 IN
64	J163 602196-901	J202-21 602346	14AWG WHT	500271- 999	40"	CHANNEL 28 OUT
65	J164 602196-901	J202-2 602346	14 AWG WHT	500271- 999	40"	CHANNEL 29 IN
66	J165 602196-901	J202-12 602346	14AWG WHT	500271- 999	40"	CHANNEL 29 OUT
67	J166 602196-901	J202-29 602346	14 AWG WHT	500271- 999	40"	EXTERNAL RESET
68	J167 602196-901	J202-30 602346	14AWG WHT	500271- 999	40"	RESET RETURN

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 30CH	A	21793	407554-001	A
	DRN			SHEET 7 of 7


SEE SEPARATE PARTS LIST
HARNESS ASSY,1260-22, TTI,40 CH
407554-002
21793
407554-002 REV.
J200
J201
J202
J100
J187
40.0 ±1.0
6.0 ±.5
NOTES
1. SEE WIRE LIST FOR CONTACT ASSIGNMENTS AND CONNECTIONS
2. MARK "J--" ON APPROPRIATE SIZE YELLOW SHRINK TUBING (ITEM 11 OR 14) APPROXIMATELY WHERE SHOWN.
3. MARK "407554-002 AND LATEST REVISION LETTER" ON APPROPRIATE SIZE YELLOW SHRINK TUBING (ITEM 17) APPROXIMATELY WHERE SHOWN.
4. PLACE APPROPRIATE SIZE CLEAR SHRINK TUBING (ITEM 12,15 OR 18) OVER MARKING APPROXIMATELY WHERE SHOWN.
5. PLACE APPROPRIATE SIZE BLACK SHRINK TUBING (ITEM 19) OVER ENDS OF BRAID (ITEM 9) APPROXIMATELY WHERE SHOWN.
6. CONNECTORS J100 - J187 WILL LATER CONNECT TO RECEIVER BLOCK TTI P/N VGRCB-32CP MATING TPA CONNECTOR IS TTI P/N VGFCB-32CP.
PROPRIETARY NOTICE

Assembly 407554-002 HARNESS A,1260-22,TTI,4OCH Rev Date 2/19/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
1	602196-901	CONTACT, PWR, MINI, 20A, TTI	EA	88.00000	J100-J187
3	602345	CQN-CAB-RCP030C. 197 20A	EA	3.00000	J200-J202
4	602346	CONTACT, SOLDER, 12GA	EA	88.00000	W/J200-J202
5	500271-999	WRTEF-STR14G-9-9-9 WHT	FT	.00001	
7	610897	TIE-CA-LKG-.062-1.25	EA	.00001	
8	500005	TIE CORD NYLON	FT	.00001	
9	GRP-110-3/4	TBGWOV-POY. 500ID-BLACK	FT	.00001	
11	M23053/5-104-4	TBGSRK-POF. 13ID-YELLOW	FT	.00001	
12	M23053/5-204-C	TBGSRK-POF. 125ID-CLEAR	FT	.00001	
14	M23053/5-109-4	TBGSRK-POF. 750ID-YELLOW	FT	.00001	
15	500104	TBGSRK-POF. 750ID-CLEAR	FT	.00001	
17	M23053/5-111-4	TBGSRK-POF1 . 50ID-YELLOW	FT	.00001	
18	M23053/5-2 11-C	TBGSRK-POF1. 50ID-CLEAR	FT	.00001	
19	500226	TBGSRK-POF1. 50ID-BLACK	FT	.00001	

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
	BLK AAx PN 01 (J100)	Uxx-SLOTyy (J200)	CABLE	407554-002		SYSTEM WIRE LIST
	BLK AAx PN 02 (J101)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 03 (J102)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 04 (J103)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN OS (J104)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 06 (J105)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 07 (J106)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 08 (J107)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 09 (J108)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 10 (J109)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 11 (J110)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 12 (J111)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 13 (J112)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 14 (J113)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 15 (J114)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 16 (J115)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 17 (J116)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 18 (J117)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 19 (J118)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 20 (J119)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 21 (J120)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 22 (J121)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 23 (J122)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 24 (J123)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 25 (J124)	Uxx-SLOTyy (J200)	CABLE	407554-002		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 2 of 9

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
	BLK AAx PN 26 (J125)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 27 (J126)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 28 (J127)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 29 (J128)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 30 (J129)	Uxx-SLOTyy (J200)	CABLE	407554-002		
	BLK AAx PN 31 (J130)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 32 (J131)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 33 (J132)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 34 (J133)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 35 (J134)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 36 (J135)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 37 (J136)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 38 (J137)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 39 (J138)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 40 (J139)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 41 (J140)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 42 (J141)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 43 (J142)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 44 (J143)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 45 (J144)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 46 (J145)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 47 (J146)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 48 (J147)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 49 (J148)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 50 (J149)	Uxx-SLOTyy (J201)	CABLE	407554-002		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 3 of 9

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
	BLK AAx PN 51 (J150)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 52 (J151)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 53 (J152)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 54 (J153)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 55 (J154)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 56 (J155)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 57 (J156)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 58 (J157)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 59 (J158)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 60 (J159)	Uxx-SLOTyy (J201)	CABLE	407554-002		
	BLK AAx PN 61 (J160)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 62 (J161)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 63 (J162)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 64 (J163)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 65 (J164)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 66 (J165)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 67 (J166)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 68 (J167)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 69 (J168)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 70 (J169)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 71 (J170)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAX PN 72 (J171)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 73 (J172)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 74 (J173)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK AAx PN 75 (J174)	Uxx-SLOTyy (J202)	CABLE	407554-002		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 4 of 9

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
	BLK Aax PN 76 (J175)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 77 (J176)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 78 (J177)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 79 (J178)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 80 (J179)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 81 (J180)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 82 (J181)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 83 (J182)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 84 (J183)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 85 (J184)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 86 (J185)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 87 (J186)	Uxx-SLOTyy (J202)	CABLE	407554-002		
	BLK Aax PN 88 (J187)	Uxx-SLOTyy (J202)	CABLE	407554-002		

This system wirelist serves as a template for incorporating this harness assembly into the overall system wirelist. It does not in any way affect the fabrication of this harness assembly.

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 5 of 9

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
1	J100	J200-11	14AWG	500271-	*40"*	CHANNEL 00 IN
	602196-901	602346	WHT	999		
2	J101	J200-1	14AWG	500271-	40"	CHANNEL 00 OUT
	602196-901	602346	WHT	999		
3	J102	J200-22	I4AWG	500271-	40"	CHANNEL 01 IN
	602196-901	602346	WHT	999		
4	J103	J200-21	14AWG	500271-	40"	CHANNEL 01 OUT
	602196-901	602346	WHT	999		
5	J104	J200-2	14AWG	500271-	40"	CHANNEL 02 IN
	602196-901	602346	WHT	999		
6	J105	J200-12	14AWG	500271-	40"	CHANNEL 02 OUT
	602196-901	602346	WHT	999		
7	J106	J200-13	14AWG	500271-	40"	CHANNEL 03 IN
	602196-901	602346	WHT	999		
8	J107	J200-3	14 AWG	500271-	40"	CHANNEL 03 OUT
	602196-901	602346	WHT	999		
9	J108	J200-24	14AWG	500271-	40"	CHANNEL 04 IN
	602196-901	602346	WHT	999		
10	J109	J200-23	14AWG	500271-	40"	CHANNEL 04 OUT
	602196-901	602346	WHT	999		
11	J110	J200-4	14AWG	500271-	40"	CHANNEL 05 IN
	602196-901	602346	WHT	999		
12	J111	J200-14	14AWG	500271-	40"	CHANNEL 05 OUT
	602196-901	602346	WHT	999		
13	J112	J200-15	14AWG	500271-	40"	CHANNEL 06 IN
	602196-901	602346	WHT	999		
14	J113	J200-5	14AWO	500271-	40"	CHANNEL 06 OUT
	602196-901	602346	WHT	999		
15	J114	J200-26	14AWG	500271-	40"	CHANNEL 07 IN
	602196-901	602346	WHT	999		
16	J115	J200-25	14AWG	500271-	40"	CHANNEL 07 OUT
	602196-901	602346	WHT	999		
17	J116	J200-6	14AWG	500271-	40"	CHANNEL 08 IN
	602196-901	602346	WHT	999		
18	J117	J200-16	14AWG	500271-	40"	CHANNEL 08 OUT
	602196-901	602346	WHT	999		
19	J118	J200-17	14AWG	500271-	40"	CHANNEL 09 IN
	602196-901	602346	WHT	999		
20	J119	J200-7	14AWG	500271-	40"	CHANNEL 09 OUT
	602196-901	602346	WHT	999		
21	J120	J200-28	14AWG	500271-	40"	CHANNEL 10 IN
	602196-901	602346	WHT	999		
22	J121	J200-27	14 AWO	500271-	40"	CHANNEL 10 OUT
	602196-901	602346	WHT	999		
23	J122	J200-8	14AWG	500271-	40"	CHANNEL 11 IN
	602196-901	602346	WHT	999		
24	J123	J200-18	I4AWG	500271-	40"	CHANNEL 11 OUT
	602196-901	602346	WHT	999		
25	J124	J200-19	14AWG	500271-	40"	CHANNEL 12 IN
	602196-901	602346	WHT	999		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 6 of 9

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART	WIRE LEN	REFERENCE
26	J125	J200-9	14 AWG	500271-	40"	CHANNEL 12 OUT
	602196-901	602346	WHT	999		
27	J126	J200-30	1AWG	500271-	40"	CHANNEL 13 IN
	602196-901	602346	WHT	999		
28	J127	J200-29	14AWG	500271-	40"	CHANNEL 13 OUT
	602196-901	602346	WHT	999		
29	J128	J200-	14AWG	500271-	40"	CHANNEL 14 IN
	602196-901	602346	WHT	999		
30	J129	J200-	14AWG	500271-	40"	CHANNEL 14 OUT
	602196-901	602346	WHT	999		
31	J130	J201-11	14AWG	500271-	40"	CHANNEL 15 IN
	602196-901	602346	WHT	999		
32	J131	J201-1	14AWG	500271-	40"	CHANNEL 15 OUT
	602196-901	602346	WHT	999		
33	J132	J201-22	14AWG	500271-	40"	CHANNEL 16 IN
	602196-901	602346	WHT	999		
34	J133	J201-21	14AWG	500271-	40"	CHANNEL 16 OUT
	602196-901	602346	WHT	999		
35	J134	J201-2	14AWG	500271-	40"	CHANNEL 17 IN
	602196-901	602346	WHT	999		
36	J135	J201-12	14AWG	500271-	40"	CHANNEL 17 OUT
	602196-901	602346	WHT	999		
37	J136	J201-13	14AWG	500271-	40"	CHANNEL 18 IN
	602196-901	602346	WHT	999		
38	J137	J201-3	14AWG	500271-	40"	CHANNEL 18 OUT
	602196-901	602346	WHT	999		
39	J138	J201-24	14AWG	500271-	40"	CHANNEL 19 IN
	602196-901	602346	WHT	999		
40	J139	J201-23	14AWG	500271-	40"	CHANNEL 19 OUT
	602196-901	602346	WHT	999		
41	J140	J201-4	14AWG	500271-	40"	CHANNEL 20 IN
	602196-901	602346	WHT	999		
42	J141	J201-14	14AWG	500271-	40"	CHANNEL 20 OUT
	602196-901	602346	WHT	999		
43	J142	J201-17	14AWG	500271-	40"	CHANNEL 21 IN
	602196-901	602346	WHT	999		
44	J143	J201-7	14AWG	500271-	40"	CHANNEL 21 OUT
	602196-901	602346	WHT	999		
45	J144	J201-28	14AWG	500271-	40"	CHANNEL 22 IN
	602196-901	602346	WHT	999		
46	J145	J201-27	14AWG	500271-	40"	CHANNEL 22 OUT
	602196-901	602346	WHT	999		
47	J146	J201-8	14AWG	500271-	40"	CHANNEL 23 IN
	602196-901	602346	WHT	999		
48	J147	J201-18	14AWG	500271-	40"	CHANNEL 23 OUT
	602196-901	602346	WHT	999		
49	J148	J201-19	14AWG	500271-	40"	CHANNEL 24 IN
	602196-901	602346	WHT	999		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 7 of 9

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
50	J149	J201-9	14AWG	500271-	40"	CHANNEL 24 OUT
	602196-901	602346	WHT	999		
51	J150	J201-30	14AWG	500271-	40"	CHANNEL 25 IN
	602196-901	602346	WHT	999		
52	J151	J201-29	14AWG	500271-	40"	CHANNEL 25 OUT
	602196-901	602346	WHT	999		
53	J152	J201-10	14AWG	500271-	40"	CHANNEL 26 IN
	602196-901	602346	WHT	999		
54	J153	J201-20	14AWG	500271-	40"	CHANNEL 26 OUT
	602196-901	602346	WHT	999		
55	J154	J201-5	14AWG	500271-	40"	CHASSIS GROUND
	602196-901	602346	WHT	999		
56	J155	J201-6	14AWG	500271-	40"	CHASSIS GROUND
	602196-901	602346	WHT	999		
57	J156	J201-15	14AWG	500271-	40"	CHASSIS GROUND
	602196-901	602346	WHT	999		
58	J157	J201-16	14AWG	500271-	40"	CHASSIS GROUND
	602196-901	602346	WHT	999		
59	J158	J201-25	14 AWG	500271-	40"	CHASSIS GROUND
	602196-901	602346	WHT	999		
60	J159	J201-26	14 AWO	500271-	40"	CHASSIS GROUND
	60219&901	602346	WHT	999		
61	J160	J202-11	14AWG	500271-	40"	CHANNEL 27 IN
	602196-901	602346	WHT	999		
62	J161	J202-1	14AWG	500271-	40"	CHANNEL 27 OUT
	602196-901	602346	WHT	999		
63	J162	J202-22	14AWG	500271-	40"	CHANNEL 28 IN
	602196-901	602346	WHT	999		
64	J163	J202-21	14AWG	500271-	40"	CHANNEL 28 OUT
	602196-901	602346	WHT	999		
65	J164	J202-2	14AWG	500271-	40"	CHANNEL 29 IN
	602196-901	602346	WHT	999		
66	J165	J202-12	14AWG	500271-	40"	CHANNEL 29 OUT
	602196-901	602346	WHT	999		
67	J166	J202-13	14AWG	500271-	40"	CHANNEL 30 IN
	602196-901	602346	WHT	999		
68	J167	J202-3	14AWG	500271-	40"	CHANNEL 30 OUT
	602196-901	602346	WHT	999		
69	J168	J202-24	14 AWO	500271-	40"	CHANNEL 31 IN
	602196-901	602346	WHT	999		
70	J169	J202-23	14AWG	500271-	40"	CHANNEL 31 OUT
	602196-901	602346	WHT	999		
71	J170	J202-4	14AWG	500271-	40"	CHANNEL 32 IN
	602196-901	602346	WHT	999		
72	J171	J202-14	14AWG	500271-	40"	CHANNEL 32 OUT
	602196-901	602346	WHT	999		
73	J172	J202-15	14AWG	500271-	40"	CHANNEL 33 IN
	602196-901	602346	WHT	999		

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 8 of 9

ENGINEERING WIRE LIST

WIRE	FROM	TO	TYPE	PART #	WIRE LEN	REFERENCE
74	J173 602196-901	J202-5 602346	14AWG WHT	500271- 999	40"	CHANNEL 33 OUT
75	J174 60219~901	J202-26 602346	14AWG WHT	500271- 999	40"	CHANNEL 34 IN
76	J175 602196-901	J202-25 602346	14 AWG WHT	500271- 999	40"	CHANNEL 34 OUT
77	J176 602196-901	J202-6 602346	14AWG WHT	500271- 999	40"	CHANNEL 35 IN
78	J177 602196-901	J202-16 602346	14AWG WHT	500271- 999	40"	CHANNEL 35 OUT
79	J178 602196-901	J202-17 602346	14AWG WHT	500271- 999	40"	CHANNEL 36 IN
80	J179 602196-901	J202-7 602346	14AWG WHT	500271- 999	40"	CHANNEL 36 OUT
81	J180 602196-901	J202-28 602346	14AWG WHT	500271- 999	40"	CHANNEL 37 IN
82	J181 602196-901	J202-27 602346	14AWG WHT	500271- 999	40"	CHANNEL 37 OUT
83	J182 602196-901	J202-8 602346	14AWG WHT	500271- 999	40"	CHANNEL 38 IN
84	J183 602196-901	J202-18 602346	14AWG WHT	500271- 999	40"	CHANNEL 38 OUT
85	J184 60219&901	J202-19 602346	14AWG WHT	500271- 999	40"	CHANNEL 39 IN
86	J185 602196-901	J202-9 602346	14AWG WHT	500271- 999	40"	CHANNEL 39 OUT
87	J186 602196-901	J202-29 602346	14 AWO WHT	500271- 999	40"	EXTERNAL RESET
88	J187 602196-901	J202-30 602346	14AWG WHT	500271- 999	40"	RESET RETURN

DOCUMENT TITLE	SIZE	CODE NO.	DOCUMENT NO.	REV
HARNESS ASSY,1260-22,TTI, 40CH	A	21793	407554-002	A
	DRN			SHEET 9 of 9

This page was left intentionally blank.